

VOL. 4
NO. 2

AMAZING STORIES - SCIENTIFIC FICTION



MAY
1929

May

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AMAZING STORIES



Stories by
Jules Verne
Stanton A. Coblentz
Clare Winger Harris



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and We'll Back Them With This GUARANTEE of a DRAFTING JOB and RAISE!



"Only one other man and I, of six taking California State Board examination for Architect passed. Then I realized the thorough and practical training given by American School. In 18 months I have gone from tracer to Chief Draftsman, in charge of all architectural and engineering work in one of the oldest offices here." R. L. WARREN, Los Angeles, Calif.



"When I started American School training in the Spring of 1915 I was working 14 hours a night, seven nights a week for \$1.83 a night. That Fall I got a job in the Engineering Dept. of a large firm near here. Today I work 5 1/2 days a week and my salary is larger than I ever dreamed of when I began that course in Mechanical Drafting." B. H. SEAVENS, South Bend, Ind.

We are looking for more ambitious young fellows with factory, building-trade or any other kind of mechanical experience to prepare for and help place in well-paid Drafting positions. Such men, we find, are unusually successful as Draftsmen, because they know how things are done, and that's a priceless asset to the man who makes the blueprint plans. For there's a great deal more to Drafting than "mechanical drawing" and reading blueprints. The real jobs, those paying \$50 to \$100 a week, give you a chance to cash in on your entire past mechanical experience. Get in touch with me and I'll tell you how.

Drafting is Logically Your Next Move!

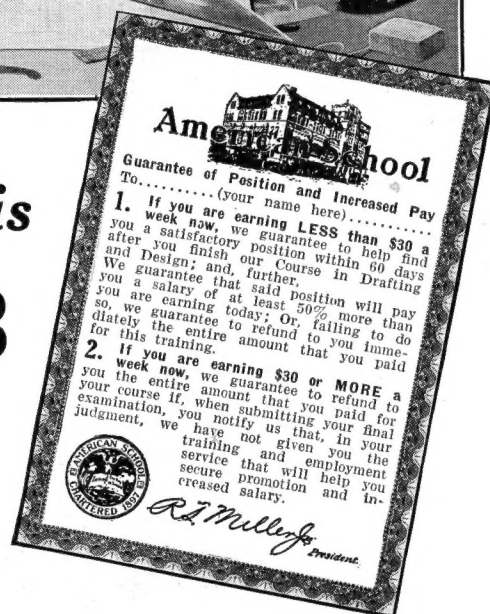
Of course you realize the biggest handicap to mechanical work is that you're limited in earning capacity to the output of your two hands, as long as you live. Even the skilled mechanic earning \$50 to \$60 a week has reached his limit. He can never earn more and when he gets old he will earn less. So I don't blame any man for wanting to get away from his futureless outlook. For wanting to get into something where he can use his head as well as his hands—where he will be paid for what he knows, instead of only for what he does. . . . You know enough about blueprints to understand that PLANS govern every move in factory and construction job. The Draftsman who makes them is several jumps ahead of the workman who follows them. And so I want you to know that DRAFTING is a logical, natural PROMOTION from mechanical and building work—better-paid, more interesting—just the kind of work you'd enjoy doing.

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The way to a fine Drafting job for you—is easier than you think. It takes no "artistic talent" or advanced education. Thousands of men no smarter than you, with no more education or ability have learned it quickly and you can, too. With the co-operation of some of the biggest employers and engineers in the U. S. we have worked out a plan to prepare you for Drafting work in your spare time at home—to actually place you in a fine position and to raise your pay. Backed by the guarantee shown above to refund the small cost, if we fail. Mail the coupon and I'll be glad to tell you all about this life-time chance to get into Drafting.

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I wish I had the room here to tell you all about DRAFTING—how it has become the most important branch of every kind of manufacturing and construction work—how fascinating the work is—what a fine bunch of fellows Draftsmen are, the big salaries paid—how while Drafting is white-collar office work, it is closely hooked-up with big projects and big men. All that takes a 36-page book to tell and I'll be glad to send it to you free, and in addition I want to send you the first three lessons of our home-training so you can see how you'll like the work and how simple it is to learn. Coupon brings everything—mail it right away.

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Name

St. No.

City..... State.....

Age..... Occupation.....

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story



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President



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Address.....
City..... State.....



JULES VERNE'S TOMBSTONE AT AMIENS
PORTRAYING HIS IMMORTALITY

AMAZING STORIES

May, 1929
Vol. 4, No. 2

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Published by Experimenter Publishing Company, Inc.

Publishers of SCIENCE & INVENTION, RADIO NEWS,
RADIO LISTENERS' GUIDE, AMAZING
STORIES QUARTERLY, YOUR BODY

Owners of Broadcast Station WRNY

In Our May Issue:

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Our Cover

this month depicts a scene from the story entitled, "The Moon Strollers," by J. Rogers Ullrich, in which two of the scientists who had gone to the moon, while on an exploration expedition, become aware of the very low gravitational attraction, because they experience such complete ease in climbing to the top of the beacon, despite their heavy strollers, which on earth would have made even ordinary walking extremely difficult.

Copyright Acknowledgment

"The English at the North Pole," by Jules Verne, copyright 1911 by Vincent Parke & Co. (Parke, Austin & Lipscomb Co.)

In Our Next Issue:

RADIO TELESCOPE, by Stanton A. Coblenz. Television seems to have been taken off the board, for a while, but there is no question as to the possibilities of radio and television in the future. With characteristic imaginative foresight, the author of "The Sunken World" gives us, in concentrated form, an extremely well written story full of plausible science.

THE MONGOLIANS' RAY, by Volney G. Mathison. Here is a capital scientific story, that would have done O. Henry honor for its rare surprise ending. It contains good science, excellent fiction, suspense and adventure and makes thoroughly interesting reading.

FINGERS OF THE MIST, by Peter Brough. Synthetic life is no novelty in the laboratory. Scientists claim to have come pretty close to the secret of life, although only microscopic living beings seem thus far to have been produced. Dr. Loeb, one of the pioneers in this field, has accomplished a good deal in his experiments with synthetic life. This story, based on accepted scientific theories, is excellently written and is of absorbing interest, and contains much food for thought.

THE ENGLISH AT THE NORTH POLE, by Jules Verne. (A Serial in 2 Parts) Part II. Though the story thus far was unusually well written, even for the father of scientific fiction, it traveled over more or less familiar territory. Now that the expeditionists have reached 78° N.L., the excitement and adventure start and we learn a great deal about the territory in the neighborhood of the North Pole—much of it, proven fact. Both the story and scientific interests are fully sustained in the concluding chapters of this story.

And others.

HOW TO SUBSCRIBE TO "AMAZING STORIES." Send your name, address and remittance to Experimenter Publishing Co., 230 Fifth Ave., New York City. Checks and money orders should be made payable to Experimenter Publishing Co., Inc. Mention the name of the magazine you are ordering inasmuch as we also publish RADIO NEWS, SCIENCE & INVENTION, RADIO LISTENERS' GUIDE AND CALL BOOKS, AMAZING STORIES QUARTERLY and YOUR BODY. Subscriptions may be made in combination with the other publications just mentioned

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Here's the PROOF



**Has Made \$10,000
More in Radio**

"I can safely say that I have made \$10,000 more in Radio than I would have made if I had continued at the old job. When I enrolled with you I didn't know a volt from an ampere. I advise all ambitious young men to get into Radio. There is no greater opportunity."

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**\$375 One Month in
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"Recently I made \$375 in one month in my spare time installing, servicing, selling Radio Sets."

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\$450 a Month

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IF you are earning a penny less than \$50 a week send for my book of information on the opportunities in Radio. It's FREE. Clip the coupon NOW. A flood of gold is pouring into this new business, creating hundreds of big pay jobs. Why go along at \$25, \$30 or \$45 a week when the good jobs in Radio pay \$50, \$75, and up to \$250 a week. My book, "Rich Rewards in Radio," gives full information on these big jobs and explains how you can quickly become a Radio Expert through my easy, practical, home-study training.

Salaries of \$50 to \$250 a Week Not Unusual

Get into this live-wire profession of quick success. Radio needs trained men. The amazing growth of the Radio business has astounded the world. In a few short years three hundred thousand jobs have been created. And the biggest growth of Radio is still to come. That's why salaries of \$50 to \$250 a week are not unusual. Radio simply hasn't got nearly the number of thoroughly trained men it needs. Study Radio and after only a short time land yourself a REAL job with a REAL future.

You Can Learn Quickly and Easily in Spare Time

Hundreds of N. R. I. trained men are today making big money—holding down big jobs—in the Radio field. Men just like you—their only advantage is training. You, too, can become a Radio Expert just as they did by our new practical methods. Our tested, clear training, makes it easy for you to learn. You can stay home, hold your job, and learn quickly in your spare time. Lack of education or experience are no drawbacks. You can read and write. That's enough.

Many Earn \$15, \$20, \$30 Weekly on the Side While Learning

My Radio course is the famous course "that pays for itself." I teach you to begin making money almost the day you enroll. My new practical method makes this possible. I give you SIX BIG OUTFITS of Radio parts with my course. You are taught to build practically every type of receiving set known. M. E. Sullivan, 412 73rd Street, Brooklyn, N. Y., writes, "I made \$720 while studying." Earle Cummings, 18 Webster Street, Haverhill, Mass.: "I made \$375 in one month." G. W. Page, 1807 21st Ave., Nashville, Tenn.: "I picked up \$935 in my spare time while studying."

Your Money Back If Not Satisfied

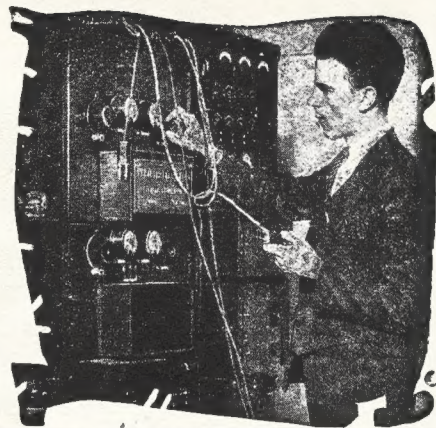
"I'll give you just the training you need to get into the Radio business. My course fits you for all lines—manufacturing, selling, servicing sets, in business for yourself, operating on board ship or in a broadcasting station—and many others. I back up my training with a signed agreement to refund every penny of your money if, after completion, you are not satisfied with the course I give you."

Act Now—64-Page Book is FREE

Send for this big book of Radio information. It won't cost you a penny. It has put hundreds of fellows on the road to bigger pay and success. Get it. Investigate. See what Radio has to offer you, and how my Employment Department helps you get into Radio after you graduate. Clip or tear out the coupon and mail it RIGHT NOW.

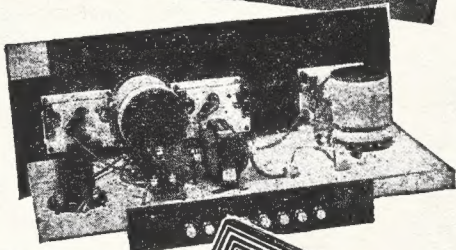
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NEEDS
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**You can build
100 circuits with
the six big outfits
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I give you**

3 of the 100 you can build



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Dear Mr. Smith: Kindly send me your big book, "Rich Rewards in Radio," giving information on the big-money opportunities in Radio and your practical method of teaching with six big Outfits. I understand this book is free, and that this places me under no obligation whatever.

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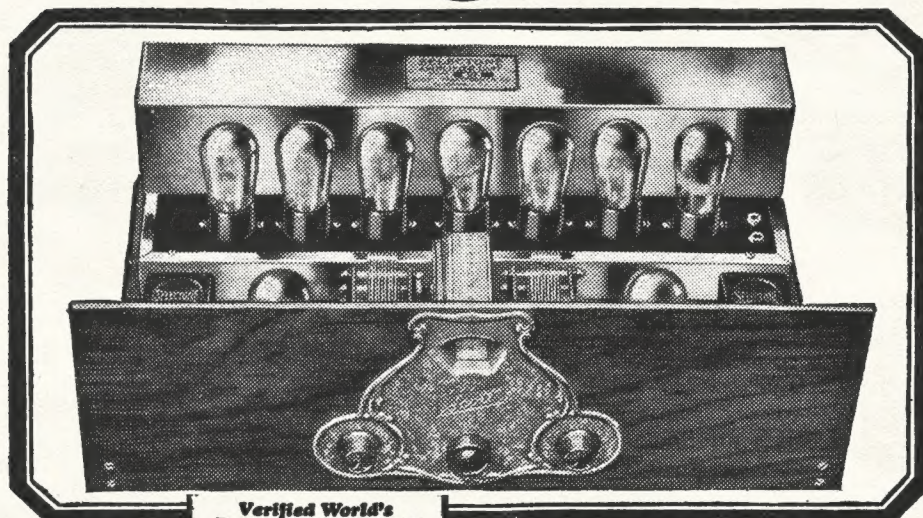
Employment Service to all Graduates
Originators of Radio Home Study Training

AS Scott World's Announcement



E. H. SCOTT
Designer of receivers holding practically all the world's records.

▲ and a policy of distribution which insures the purchaser's complete sat-



ONE DIAL Control on the New Scott A.C. Nine

The New Scott World's Record A.C. Nine which again repeats its unanswered challenge to the whole world of radio to equal its performance in any kind of competitive test, is now improved by the embodiment of *Single Dial Control*. Now, by merely plugging into your light socket and turning one small knob, practically any station within 10 kilocycles of any other station is brought in with thunderous volume and with vigorous, life-like, full-rounded tone. Anyone can tune the Scott World's Record A.C. Nine now. Anyone can fully enjoy its oft-demonstrated limitless range and revel in the endless parade of distant stations its brightly illuminated drum dial records. Thoroughly shielded—perfectly stable—no hum—using A.C. tubes—stations come in at only one point on the dial and always at the same point.

Truly, in all its history, radio has never offered so much as is available to you in this latest model of the one proven World's Greatest Receiver.

The New Scott Symphony MODEL A.C. or D.C.

To meet the demand for a better performing custom built small receiver which is low in price but high in performance,

The NEW. 4 TUBE MODEL

the new Scott Symphony was created. One stage of Shield-Grid Amplification is used, making it the equal to many nine tube sets and is surpassed in general performance only by the new Scott World's Record A.C. Nine. One dial control—easily tunes out the locals and brings in distant stations. Engineered to the same quality standard as the nine tube model and backed with the same unqualified guarantee of superior performance and complete satisfaction.

ance only by the new Scott World's Record A.C. Nine. One dial control—easily tunes out the locals and brings in distant stations. Engineered to the same quality standard as the nine tube model and backed with the same unqualified guarantee of superior performance and complete satisfaction.

Self-contained power supply in A.C. Model

The A.C. Model of the Scott Symphony is equipped with built in A.C. power supply which supplies filament, plate and grid current to all A.C. tubes used and the 171 A power tube. The D.C. Model is so designed electrically, that its current consumption is extremely low, thereby making it the ideal receiver for sections where A.C. current is NOT available or where it is desired to use batteries.

SCOTT

MAIL COUPON

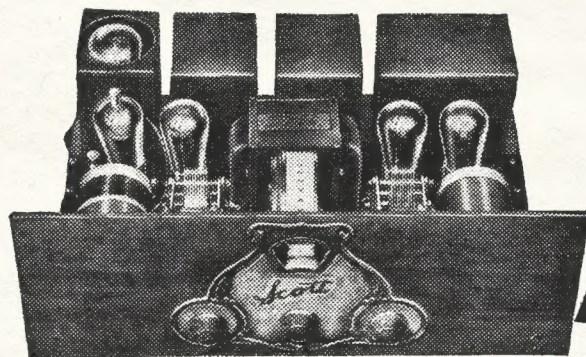
Scott Receivers are designed for those who have tried other receivers and are now looking for something BETTER. They are custom built to your order and are sold only thru Radio Technicians carefully selected by the Scott Transformer Company. This policy of distribution puts you in contact with a man with years of radio experience and who has a thorough, practical knowledge of radio—who can supply you with a precision instrument that is guaranteed to outperform any other receiver available today—and who will take care of that instrument for you from the time of purchase. This policy eliminates all possibility of dissatisfaction on your part. Send coupon TODAY for full particulars and for name of your local franchised SCOTT Representative.

Send me full particulars of:
☐ Scott World's Record A.C. Nine
☐ Scott Symphony
☐ Scott Power Supply
☐ Scott Power Amplifier
 Also send me name of nearest franchised Scott Representative.
 Name.....
 Street.....
 City.....
 State.....

Verified World's Records Held by Scott Receivers

- (1) A world's record for number of stations heard, distance 6,000 to 8,000 miles.
 6 stations distance 6,000 miles.
 7 stations distance 7,000 miles.
 6 stations distance 8,000 miles.
- (2) A world's record for greatest number of programs heard from stations distant 6,000 or more miles.
 19 programs 8,000 or more mls.
 19 programs 7,000 or more mls.
 79 programs 6,000 or more mls.

THIS is the New Scott World's Record A.C. Nine with the Single Dial Control. The intermediate amplifier is completely shielded. The appearance of the receiver is that of the fine precision instrument which it is.



Send Today

Wood Ave., Chicago

RECORD RADIOS

of New 1929 Models

isfaction and protects all
the professional set build-
er's *profits* ▲▲▲▲

Professional Set Builders! Scott Apparatus Now Sold Only thru CUSTOM SET BUILDERS

The custom building of fine radio receivers is *still* a profitable profession with our plan for those who are technically qualified, because there are thousands of people who want the best there is in radio and who know that the best cannot be produced by mass production methods but only thru the custom method of hand building.

This season Scott Products will not be sold direct to consumers nor thru jobbers, but exclusively thru professional custom set builders. We have adopted this policy because we believe in you and recognize the fact that your ability to deliver a far better receiver than any mass-production factory can make, and our protection of your market, will result in the growth of your business, and in turn, the growth of ours. Our line this season is complete and will enable you to supply a Scott receiver in a good console from as low as \$90.00 to as high as \$1,500. It embraces the Scott World's Record Shield Grid Nine, the Scott World's Record A. C. Nine, the Scott Symphony in both A. C. and D. C. models, and a line of cabinets which enable you to out-class, at the right price, anything else in the field.

We Help You Promote Sales

We have, ready to imprint your name thereon, illustrated advertising mailing pieces for you to use in spreading the news of your appointment as the franchised Scott Builder in your locality. Our 48 page book "How to Sell Good Custom Built Radio" tells you all about the Scott Plan and our proposition. It is the first and only complete, practical treatise ever prepared which clearly points the way to financial success for the Custom Set Builder. It is, however, sent only to those who can qualify and meet our standards as a Custom Set Builder.

MAIL COUPON

For Qualification Blank

The Scott Franchise is, most naturally, a valuable one. Not only because of the obvious superiority of Scott Receivers, but because after you are appointed a Scott Franchised Builder, you will have taken a step towards establishing for yourself a REAL PROFITABLE business that will, with our co-operation and assistance, enable you to make more money than you ever dreamed was possible in the Custom Set building business.

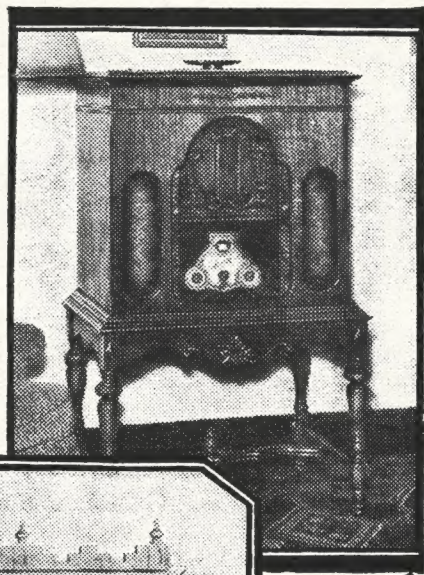
TRANSFORMER COMPANY

4450 Ravenswood Avenue ▲ CHICAGO, ILLINOIS

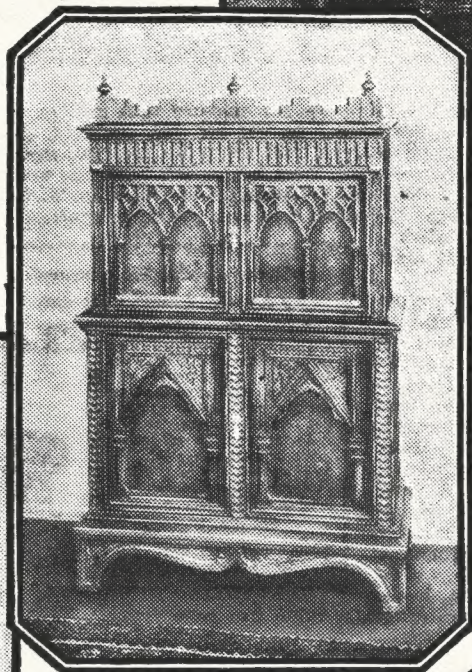


Complete Line of CABINETS

Never before have we had a more beautiful or complete line of cabinets. They are the last word in "modernness" with sliding doors, rich selected walnut burls, hand rubbed finish. We show on these pages three of our ten different models and all are fine examples of the modern furniture craftsman's art. They will enable you to meet every cabinet demand from the most modest to the massive, rich, dignified hand carved console that will add distinction to the finest home. You can secure four of these consoles either with or without phono combinations. All are of the very highest quality and workmanship but are priced unbelievably low.



ABOVE:
The
Taranaki
TO THE LEFT:
The
Canterbury
BELOW:
The
Milford



Set Builders! MAIL THIS COUPON

Send me details of your new models and Professional Set Builder's Qualification Blank and your proposition. I understand that your 48 page book "How to Sell Good Custom Built Radio" will be mailed me after 10 days.

Scott Transformer Co., 4450 Ravenswood Ave., Chicago
EXP-G-5

Name Street City State

Mammy Goes Home

by Radio

!



Steps right out thru
powerful local Chicago
stations,--and finds
Birmingham, Alabama
with

New Radio Invention

"I Sho' was Happy!," says Mammy Jo

MAMMY JO was waiting up for us—her eyes rolling with excitement. She had been lonesome all day, she said. Even with her two small charges, and the radio for company, she was blue—just pining for a voice from home. We knew she used to try, time and again, to pick up broadcasts from Southern Stations, but without any success. However, that was not surprising; strong local stations had always smothered out distant ones on my radio.

"I think that Radio's gone crazy," now cried Mammy joyfully. "I just thought I'd find me some peppiah music to cheah me up, so I starts foolin' with the dials. Nex thing I knows, the announcah man says I's listenin' to Station WAPI, at Bummin'ham, Alabama—and thah I was, down in my Own Home Town! I listens to that station fo' a long time, and I sho' was happy. Dey ain't got music like dat up heah. No SUH! I sho' does think dat thing has gone crazy."

Ground Wave Reception

"No it hasn't Mammy," I laughed. "You've just been getting Ground Wave Reception with my new antenna, Subwave-Aerial. Until yesterday, I had my antenna up on the roof. That's why air noises and all the big powerful broadcasting stations we have around here in Chicago kept out-of-town stations away. Don't you remember, Mammy, you asked me yesterday why I was digging a hole in the ground under this window—and I told you I was digging up a new radio?"

"Yes Suh," grinned Mammy. "But does you all mean to say dat aerial business got me myhome town?"

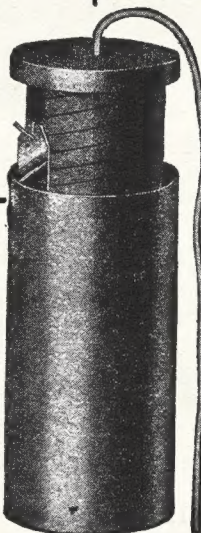
"That's right Mammy," I assured her. "You know it's

Subwave-Aerial Recommended by Licensed Radio Operator

"After thoroughly testing your Underground Antenna I find that it gives entirely satisfactory results. I would recommend it in place of inside aerials, roof aerials or loop aerials, for reasons of clearer reception, reduced pick-up of outside interference and static, easy and convenient installation and it is non-directional."

Wm. Stringfellow.

(Reprinted by permission of
Mr. Stringfellow)



the aerial that picks up radio waves and brings them to the set. When the aerial is in the ground, it's protected from a lot of interference. From now on you can probably go back to Alabama every night."

Reduces Static—Gets Clearer, Sweeter Tone

That was explanation enough for Mammy Jo. But when I told my friends about my amazing new underground aerial—how it reduces noise, gets clearer reception on both near and far stations, better selectivity too, and much finer tone—and that it didn't cost me a cent more than an ordinary aerial—and is guaranteed for 25 years—every one of them wanted to know all about it and try out a Subwave-Aerial.

YOU can test Subwave-Aerial FREE

When Subwave-Aerial can get results such as illustrated by the story above why let noise and interference keep you from getting distance on your radio?

Now you are given the opportunity to try out this wonderful new radio development without risking a cent. There's a new radio thrill in store for you! We feel confident that when you've heard the amazing difference in reception, and realize the great convenience of this modern combined antenna and ground, you'll wonder how you ever put up with the old, inefficient, dangerous method. Hurry and send for all the interesting details about Subwave-Aerial! Mail the coupon Today!

UNDERGROUND AERIAL PRODUCTS

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St. Clair and Erie Streets Chicago, Ill.

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St. Clair and Erie Streets, Chicago, Ill.

Rush Illustrated literature on the new Subwave-Aerial and details
of your Free Test Offer. No obligation to me.

Name

Address

City..... State.....

VOLUME

4



AMAZING STORIES

THE
MAGAZINE
OF
SCIENTIFICTION

MAY, 1929
No. 2ARTHUR H. LYNCH, *Editor-in-Chief*DR. T. O'CONOR SLOANE, Ph.D., *Associate Editor*MIRIAM BOURNE, *Associate Editor*C. A. BRANDT, *Literary Editor*

Editorial and General Offices: 230 Fifth Avenue, New York, N. Y.

Extravagant Fiction Today - - - - - *Cold Fact To-morrow*

"AMAZING STORIES"

By T. O'CONOR SLOANE, Ph.D.



AMAZING STORIES is now entering its fourth year. It has attained wide appreciation, and has a large circle of readers, who are its friends in the truest sense. It is a completely new idea, and in the business world, new ideas are recognized as very dangerous. AMAZING STORIES, however, won success from the start. To use an expression which has become a colloquialism, it is something different. The basic idea of the magazine was the publication of fiction, founded on, or embodying always some touch of natural science.

The first issue appeared in April, 1926, and contained nothing but reprints of the best scientific fiction of the past. More and more authors have been attracted by AMAZING STORIES as a vehicle for their work, and now we have become virtually a magazine of original stories. Some stories published many years ago are so distinctively good, that from time to time we give reprints in our columns. We are now receiving so large a number of excellent stories from authors—many well-known, and many yet to become well-known—that we can be more and more discriminating in our choice.

AMAZING STORIES started as a monthly publication. It made its mark and the public wanted more, so we heeded the demand, and issued an Annual. But even that seemed insufficient, so we substituted for it a Quarterly issue. And we experience no difficulty in getting new stories of scientific fiction.

We have published many stories on interplanetary travel. This subject remains a great favorite with our readers. Though it appears an impossible achievement, our authors make it a vehicle for much science, astronomical and in other branches. The Fourth Dimension, which is after all to be regarded as a mathematical conception, has been very ingeniously used by some of our writers. From archeology, the science in our stories runs through geology, chemistry, biology, psychology, and others, for the entire field of science is covered in the various stories published in these pages. And it is no wonder.

Among our authors we number chemists, physicians, astronomers, psychiatrists, and other leaders of thought in their scientific fields. To these it is a pleasure we are sure, to enter the realm of fiction, and use their knowledge there, for the instruction, as well as amusement of their readers.

We know our readers take much of the contents of the stories seriously, for we constantly hear from our correspondents that they have been taken well on the road of natural science by reading AMAZING STORIES and AMAZING STORIES QUARTERLY.

The change in editorial management, which this magazine has recently experienced, will result in a great improvement. The editorial policies will suffer no change except in the direction of effecting progressive improvements. It is a pleasure to us to be able to state that some of our better known authors, such as Dr. David H. Keller, Dr. Miles J. Breuer, Harl Vincent, Stanton A. Coblentz, Clare Winger Harris, Edmond Hamilton, Dr. Edward B. Smith, author of "The Skylark of Space," who promises us a sequel soon, Frederick Arthur Hodge, author of "A Modern Atlantis," Earle L. Bell, and others—are going to stand by AMAZING STORIES and will continue as contributors to the MONTHLY and QUARTERLY. And their efforts, because of the various improvements we have already been able to institute, will, we feel sure, exceed anything they have done in the past.

Our "Discussions" Department, which has acquired much importance on account of the many splendid letters we receive, from which we select the most interesting for publication, will continue intact. Many of the letters are of a high order of merit and often some operate to keep our authors on the straight and narrow path, for it seems no errors in science will escape our readers. This department, like the rest of the magazine, we will endeavor to make better and better.

It is your magazine and we want to keep it your magazine. We can do so only if you will write us your opinions and give us constructive criticism, by which we may be guided.

The ENGLISH at the NORTH POLE

By Jules Verne

Author of: "Off on a Comet," "A Trip to the Center of the Earth," etc.

CHAPTER I The "Forward"

TO-MORROW, at ebb tide, the brig *Forward* will sail from the New Prince's Docks, captain K. Z.; chief officer, Richard Shandon; destination unknown."

Such was the announcement which appeared in the *Liverpool Herald* of April 5, 1860.

The departure of a brig is not a very important event for one of the largest trading ports in England. Indeed, who would notice it among the crowd of ships, of every tonnage and every nation, which the long miles of floating docks can scarcely contain; and yet from an early hour on the morning of April 9th, numbers of people began to assemble on the wharf. The whole maritime population of Liverpool seemed to agree to congregate there, and not only the sailors, but all classes, came flocking thither. The dock laborers left their work, the city clerks their dingy counting-houses, and the shopkeepers their deserted shops. Omnibus after omnibus set down its load of passengers outside the dock walls, till the entire city appeared to have turned out to see the *Forward* sail.

The *Forward* was a brig of 170 tons, fitted up with a screw propeller and an engine of 120-horse-power. She might easily have been confounded with other brigs in port by the ordinary onlooker, and yet to the practiced eye of a sailor there were certain peculiarities about her which made her unmistakable, as appeared from the conversation of a group of men assembled on the deck of the *Nautilus*, a vessel lying close by. They were eagerly discussing the probable destination of the *Forward*, and each one had his own conjecture.

"What do you think of her masts?" said one. "It certainly ain't usual for steamships to have such large sails."

"Depend upon it," said a broad, red-faced quartermaster, "that yon craft reckons more on her masts than her engine. She hasn't all that topsail for nothing. To me it is clear enough the *Forward* is bound for the Arctic or Antarctic Seas, where great ice mountains shut out the wind rather more than suits a strong, brave ship."

"You must be right, Master Cornhill," said a third sailor; "and have you noticed the bow, what a straight line it makes to the sea?"

"Ay! and more than that, it is sheathed with cast-steel as sharp as a razor, which would cut a three-decker in two if the *Forward* fell foul of it bow-on at full speed," replied Cornhill.

"That it would," added a Mersey pilot, "for she can make fourteen knots an hour easily with her screw. It was wonderful to see how she cut through the water on her trial trip. Take my word for it, she's a good runner, and no mistake."

"Besides," said "Cornhill, "do you see the size of the stern-post?"

"Yes; but what does that prove?"

"That proves, my boys," said Cornhill, in a disdainful, self-satisfied manner, "that you can neither see nor think; that proves that it was a great matter to give full play to the rudder, a very necessary thing in the frozen seas of the north."

"Right, right," said the sailors.

"And, what's more," continued one of them, "the loading of the ship confirms your opinion. I had it from Clifton, who is one of her men, that she is taking provisions for five years, and coal too. That is all the cargo; nothing but coal and provisions, and great bales of woolen clothing and seal-skins."

"That settles it, of course," replied Cornhill. "But you say you know Clifton—hasn't he told you where they are going?"

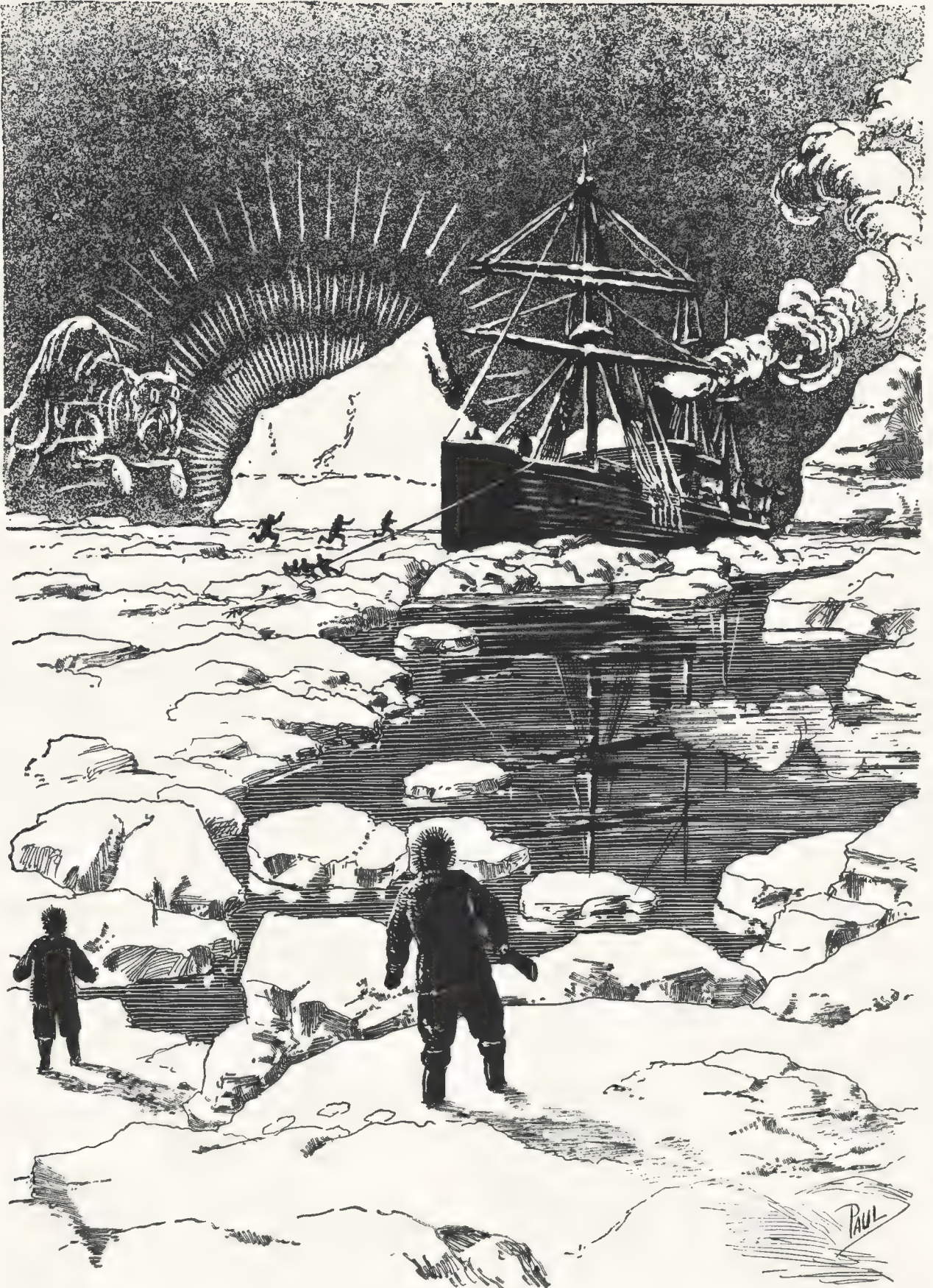
"He doesn't know himself; he is in perfect ignorance. All the crew have been engaged like that. Where he's going, he'll hardly know himself before he's there."

"It looks to me very much as if they were all going to Old Nick," said an incredulous listener.

"And did you ever hear of such wages?" continued Clifton's friend. "Five times more than the common pay! Ay, if it hadn't been for that, Dick Shandon wouldn't have found a man to sign the articles. To make a voyage in such a queer-looking ship, bound for nobody knows where, and coming back nobody knows when—I must confess it wouldn't suit me."

"It doesn't matter much whether it would or not,

BECAUSE of his very accurate description, it seems hard to believe that Jules Verne did not personally visit the polar regions and himself endure the hardships and enjoy the adventures with the characters of his stories. His descriptions of advance scientific machinery and ideas, are no less realistic. He tells us, in his story, about the regions through which a number of "North Pole Expeditions" had passed and hoped to pass; he tells about the formation of icebergs and about the movement of ice—all of which can be checked up as to accuracy. But he does not forget the human interest in this story—which enhances it considerably.



A strange looking animal with smoking tongue hanging out of his enormous wide open jaws was bounding towards the ship. . . . He seemed more than twenty feet high. His hair stood on end and his formidable tail swept the snow and sent it flying in thick clouds. He was evidently in pursuit of the sailors. The apparition of such a monster was enough to scare the bravest.

old fellow, for you couldn't go; they wouldn't have you on board the *Forward*," said Cornhill.

"Pray, why not?"

"Because you can't meet one of the conditions required. I am told that all married men are ineligible, so you are shut out."

"There's so much bounce about the brig altogether," Cornhill went on, "even down to the very name, the *Forward*. Forward where to? And then there is no captain!"

"Yes, there is," said a frank, boyish-looking young sailor.

"**W**HAT! a captain has turned up?"

"Yes, a captain."

"You are fancying, youngster, that Shandon is the captain," said Cornhill.

"But I tell you," returned the lad, "that—"

"And I tell you," interrupted Cornhill, "that Shandon is the mate and nothing more. He is a brave hardy sailor, an old hand in whaling expeditions, and a thorough good fellow, quite fit to be captain, but captain he is not, any more than you or I. He doesn't even know who is to take the command. At the right time the real captain is to make his appearance, but when that is to be, or in what part of the world, no one knows, for Shandon has not said, nor is he allowed to reveal the ship's destination."

"All that may be, Master Cornhill," replied the young sailor, "but I assure you that at this very moment there is someone on board, someone whose arrival was announced in the very letter which contained the offer to Mr. Shandon of chief officer's berth!"

"What!" retorted Cornhill, frowning angrily at the audacious youngster. "Do you dare to stand out that there is a captain on board?"

"Yes, certainly, Master Cornhill."

"You say that to my face!"

"Of course I do; I had it from Johnson, one of the officers on board."

"From Mr. Johnson?"

"Yes, he told me himself."

"Johnson told you, did he?"

"He not only told me, but showed me the captain."

"Showed you the captain!" repeated Cornhill in blank amaze.

"Yes! he showed me the captain."

"And you really saw him?"

"Yes! with my own eyes."

"And who is it, pray?"

"It is a dog."

"A dog?"

"A dog with four feet?"

"Yes!"

The sailors of the *Nautilus* seemed stupefied. Under any other circumstances, such a declaration would have provoked shouts of laughter. The idea of a dog being captain of a brig of 170 tons! It was too ludicrous. But there was something altogether so extraordinary about this *Forward* that one need think twice before denying or even ridiculing the boy's assertion, and in-

stead of laughing, Cornhill said with great gravity:

"So it was Johnson who introduced you to this novel sort of a captain, and you actually saw him?"

"As plain as I see you."

"Well, Cornhill, what do you think of that?" asked the sailors, eagerly.

"I think nothing," replied Cornhill, roughly, "except that the *Forward* either belongs to the devil, or to some fool let loose from Bedlam!"

The crew continued silently gazing at the wonderful brig, watching the final preparations for departure, but not one among them dared to say, or even so much as pretended to believe, that Johnson had been only making a fool of the boy, and imposing on his credulity.

The story of the dog had already got abroad, and more than one among the crowds that thronged the quays sought to catch a glimpse of this dog-captain, half-believing him supernatural.

Besides, for many months past the *Forward* had been attracting public attention. The peculiarities about her build, the mystery hanging over her, the incognito preserved by the captain, the strange way in which Shandon had received his appointment, the special care taken in selecting the crew, and the unknown destination—all combined to invest her with a singular charm of romance.

The *Forward* had been constructed at Birkenhead by Messrs. Scott & Co., one of the most famous ship-builders in England. The firm had received from Richard Shandon a minute plan, detailing every particular as to tonnage and dimensions, and also a sketch drawn with the greatest care, and evidently the production of a practiced seaman. As considerable sums were forthcoming, the work was commenced at once, and proceeded with as rapidly as possible.

The brig was characterized by the utmost solidity. She was evidently intended to resist enormous pressure, for the frame was not only made of teak-wood—a sort of tree which grows in India, and is remarkable for its extreme strength—but was firmly bound together by strong iron ties. It was indeed a matter of surprise among the seafaring population that frequented the building yard, why the entire hull was not iron plate like that of most steamers, and many inquiries were put to the shipwrights, but all the answer received was that they were obeying orders.

By slow degrees the brig began to take shape on the stocks, and connoisseurs were struck by the elegance and power of her proportions. As the crew of the *Nautilus* had remarked, the stem made a right angle with the keel. It had no figure head, but was a sharp edge of cast steel made in the foundries of R. Hawthorn, at Newcastle. This metal, glittering in the sun, gave a peculiar look to the ship, though there was nothing absolutely warlike about it. However, there was a cannon of 16 lbs. calibre mounted on the fore-castle, on a pivot, to allow of its being easily pointed in all directions; and yet, in spite of both stem and cannon, the vessel was not the least like a ship intended for battle.

On the 5th of February the *Forward* was ready, and

had a successful launch in the presence of an immense crowd of spectators.

The day after the launch, the engine arrived from Newcastle, from the works of Messrs. Hawthorn. This engine, of 120-horsepower, and provided with oscillating cylinders, was of considerable size for a brig of 170 tons, but did not take up much room. As soon as it was placed on board, the work of provisioning began, and no easy matter it was to stow away food for six years. The stores consisted principally of salted and smoked meat, dried fish, biscuit and flour; mountains of coffee and tea were thrown into the hold in a perfect avalanche. Richard Shandon superintended personally the storage of this precious cargo, arranging it like a man who understood his business. Everything was numbered and labeled and disposed in the most orderly manner. A large quantity of pemmican was also taken on board, an Indian preparation, which contains much nourishment in small bulk.

The nature of the provisions left no doubt as to the length of the cruise; and to an observing eye, there was none as to the ship's destination, at the sight of those barrels of lime-juice, and lumps of chalk, and packets of mustard, and sorrel, and cochlearia seed; in other words, the abundance of anti-scorbutic preparations proved that the *Forward* was bound for the Polar Seas. Shandon had no doubt received special orders about this part of the cargo, for he paid studious attention to it, and also fitted up the medicine chest with the most scrupulous care.

The stock of firearms was not great, a reassuring fact to timid people, but on the other hand, the powder-magazine was full to overflowing. What was it intended for? There was far more than one solitary cannon could possibly use. Then there were also enormous saws, and other implements, such as levers, hand-saws, bags of bullets, heavy hatchets, not to speak of a goodly number of blasting cylinders, the explosion of which would have blown the Custom House at Liverpool into the air. It was all very strange, if not alarming, even without taking into account the fuses, and signals, and fireworks of all descriptions.

The boats too were objects of great curiosity to the gaping crowd that hung about the New Prince's Docks. There was a canoe made of tinned iron, covered with gutta-percha, a long mahogany whaling-boat, and a number of halkett-boats or india-rubber cloaks, which could be converted into canoes by inflating the lining.

The *Forward* was certainly altogether a most mysterious, puzzling vessel, and people grew quite excited about her, now that the hour for sailing had come.

CHAPTER II

The Unexpected Letter

EIGHT months prior to the time when our story commences, Richard Shandon had received the following letter:

"ABERDEEN, Aug. 2nd, 1859.

"Sir—This letter is to inform you that a sum of

£16,000 Sterling has been placed in the hands of Messrs. Marcuart & Co., bankers, Liverpool. I also enclose checks signed by me, which you can draw on the said bankers up to the above-mentioned amount.

"You do not know me. It matters not. I know you. That is the most important thing.

"I offer you the place of chief officer on board the brig *Forward*, bound for an expedition which may be long and perilous.

"If you refuse, that is all about it; if you accept, your salary will be £500, to be raised one-tenth each year you are away.

"The brig *Forward* has at present no existence. You will have to get her built, and ready to go to sea by the beginning of April at the latest. That, I am convinced will be easily possible.

"I subjoin a detailed plan and a draft, to which you will scrupulously adhere. The ship is to be constructed by Messrs. Scott & Co., who will arrange matters.

"I beg you will pay special attention to the selection of the crew of the *Forward*. This will consist of the captain, myself, the chief officer, yourself, a second mate, a boatswain, two engineers, an ice-master, eight sailors, and two stokers—eighteen men altogether, including Dr. Clawbonny, of your city, who will carry the proper credentials and will introduce himself to you at the right time.

"It is necessary that all the men chosen for the expedition of the *Forward* shall be English, unencumbered by family ties, unmarried, sober, as neither beer nor spirits are allowed on board, and ready for any enterprise and any suffering.

Give the preference to those of sanguine temperament, who possess a great amount of animal heat. That is very important.

"You will offer them five times as much as the ordinary wages, with an increase of one-tenth each year of service. At the close of the expedition £500 is guaranteed to each man and £2,000 to yourself. These deposits will be left with Messrs. Marcuart & Co., the aforesaid bankers and will be handed over to them on their return.

"The campaign will be long and arduous, but honorable. You need have no hesitation about it.

"Reply to me by letter, addressed to K. Z., *Poste restante*, Gotteborg, Sweden.

"K. Z., Captain of the *Forward*.

"P. S.—On the 15th of February next you will be forwarded a large Danish stag-hound with loose hanging lips, very dark in color, and striped with black. You will take him on board, and order him to be fed with barley bread mixed with boiled greaves.* You will notify his safe arrival to me at Leghorn, Italy, addressed to the same initials.

"The captain of the *Forward* will present himself, and make himself known when he is required. You will receive further instructions just before you sail.

"K. Z.

"To Mr. Richard Shandon, Liverpool."

*The sediment of melted tallow.

CHAPTER III Dr. Clawbonny

RICHARD SHANDON was a good sailor and a man of established reputation. He had been in command of whalers for years, and was familiar with the Arctic Seas. A letter like the foregoing did not consequently astonish him so much as might have been expected. Astonished he certainly was, but in a cool, composed sort of fashion, like a man who has received similar communications before. He was in a position, too, to meet the required conditions. He had neither wife, nor child, nor relatives; he was free, in all respects. So having no one to consult, he went straight off to the bankers, Messrs. Marcuart & Co., for "if the money is there," he said to himself, "the rest is all right."

The money was there sure enough, for Shandon was received by the firm with all respect due to a man who has £16,000 quietly waiting for him in their strong chest; so without loss of time he called for pen and ink, and wrote a letter in a large sailor-like hand, to the address given, signifying his acceptance of the offered trust.

That very same day he put himself in communication with the shipbuilders at Birkenhead, and twenty-four hours after, the keel of the *Forward* was laid on the blocks in their building-yard.

Richard Shandon was about forty years of age, a robust, brave, energetic fellow—three qualifications necessary to a sailor, for they impart self-reliance, vigor, and sangfroid. He got the character of being jealous and difficult to get on with, one who had made his men fear him, but never gained their love. This did not interfere, however, with his getting a crew, for he was too well known as a skillful leader to have any trouble in finding men to follow him.

Shandon was rather afraid, though, that the mysterious nature of the enterprise would cripple his movements, and determined to noise it abroad as little as possible. "That's my best plan," he said to himself, "for those old ferrets would be down on me, who must know the why and the wherefore of everything, and as I am quite ignorant myself, I should be rather at a loss for an answer. This K. Z. is a queer old fellow, and no mistake, but, after all, what does that matter? He knows me, and reckons on me, and that is enough. As to the ship, she will turn out a beauty, and my name is not Richard Shandon, if she is not meant for the frozen seas. But I'll keep that secret to myself and my officers."

Shandon's next business was to pick out his men in accordance with the rules laid down by the captain. He knew a fine active young fellow, called Wall, who was thirty years of age, a capital sailor, and who had been on more than one voyage to the North Seas. He offered him the post of second mate, and James Wall accepted it blindfold, for all he cared for was being on the ocean, and the destination mattered little.

Shandon related the whole story, however, from beginning to end, both to him and to a sailor named

Johnson, whom he chose as boatswain—without trouble.

"Not much luck to be had there," said James Wall; "But still perhaps as much there as anywhere else. Even if it is to find the North-West Passage, people come back alive, right enough."

"Not always," said Johnson; "but that's no reason for not going."

"Besides, supposing we are right in our conjectures, added Shandon, "we must allow we could hardly make a voyage under more favorable circumstances. The *Forward* will be a first-rate ship, and her steam-engine will be a great help. All we want is eighteen men."

"Eighteen men?" replied Johnson; "that is the same number the American, Dr. Kane, had on board when he made his famous journey towards the Pole."

"It is singular enough, certainly," said Wall, "what can induce a private individual to cross the sea again, to go from Davis Strait to Bering Strait. The Franklin Expeditions have cost England more than £760,000, without producing any practical result. Who can be fool enough to throw away his own fortune into the bargain like this?"

"Don't forget, James, though," replied Shandon, "that we are reasoning on a mere supposition. Whether we are actually going to the North or the South Seas, I know no more than you. Perhaps, indeed, it is on some new quest altogether. Moreover, there is a Dr. Clawbonny to make his appearance some of these days, who will no doubt be commissioned to give us fuller information. We shall see all in good time."

"Ay! we must just wait," said Johnson, "And, meantime, I am going to make it my business to look after good men to go with us; and as to their having plenty of animal heat in them, I'll guarantee that before hand. You may safely leave that to me."

THIS Johnson was a valuable man, well acquainted with the northern latitudes. He had been quartermaster on board the *Phoenix*, one of the vessels dispatched in search of Franklin in 1853. The brave fellow had accompanied Lieutenant Bellot in his journey across the ice, and been eye-witness of his death. Johnson knew the whole seafaring population of Liverpool, and set to work immediately to select his crew.

He was so effectually aided by Shandon and Wall, that by the beginning of December the number was complete. But the task had not been easy; many had been attracted by the tempting pay offer but had not courage to risk the unknown expedition, while more than one who had bravely pledged himself to go, came and retracted his word and gave back his advance note, having been dissuaded by his friends from so hazardous an undertaking. All, of course, wished to penetrate the mystery, and so pressed Shandon with questions, that he was obliged to refer them to Johnson, who gave the same unvarying answers to each.

"What is it you want me to tell you, old boy?" he would say. "I know no more than you do. Anyhow, you'll be in good company, with jolly fellows who know what they're about. That's something, isn't it? So be quick and make up your mind—take it or

leave it! We have no time to dilly-dally along."

Sometimes he would add, "My only difficulty is which to choose, for such high wages as you are offered, will find plenty to jump at them. Not a man among you ever heard of such pay being given before."

"Well, it certainly is a great temptation; we should get enough to live on all the rest of our days," said the sailors.

"I don't conceal from you," continued Johnson, "that the expedition will be a long one, and full of hardship and danger. That is formally told us in our instructions, so let us have a clear understanding, that each man may know what he undertakes; he commits himself, in all probability, to attempt all that is, humanly speaking, possible, and perhaps even more. If you haven't a brave heart, then, and an iron constitution, or if you can't look the certainty in the face that there are twenty chances to one against your ever returning, you had better be off, and leave the berth for somebody less chicken-hearted."

"But at least tell us who the captain is," was the rejoinder.

"The captain is Richard Shandon, till he introduces you another."

Now, to speak the truth, Richard thought this himself, and quietly indulged the hope that, at the last moment, he would receive definite instructions about the voyage, and have entire command placed in his hands.

Shandon and Johnson had implicitly obeyed the injunctions given for choosing the crew. They were all fresh and florid looking, full of energy and pluck, and having caloric enough in them to heat the boiler almost; in fact, the very men to stand extreme cold. In outward appearance, certainly, they were not all equally strong; and two or three among them, especially two sailors called Gripper and Garry, and Simpson the harpooner, Shandon almost hesitated to take, for they belonged to "Pharaoh's lean kine," but they were well-built, and their circulation was good, so their names were entered.

The whole crew were Protestants, belonging to the same religious denomination. It was a matter of some importance that the men should think alike, as far as creed was concerned, to prevent party strife; for it has been always found in long voyages that assembling the men for reading the Scriptures and common prayer is a powerful means of promoting harmony, and of cheering them in hours of despondency. Shandon knew by experience the excellent moral effect of such practices, as they are invariably adopted on board all vessels that winter in Arctic regions.

The next business of Shandon and his officers was the provisioning of the ship. In doing this they strictly followed the instructions of the captain—instructions so clear, precise, and minute, that the quantity and quality were given of even the smallest article. Ready money was paid for everything, and a discount of eight per cent. received, which Richard carefully put to the credit of K. Z.

Crew, provisions, and cargo were all ready by Janu-

ary, 1860. The *Forward* was rapidly assuming proportions, and Shandon never let a day pass without a visit to Birkenhead, to see how things went on. On the 23rd of that same month, he was going across as usual in one of the large steamers that ferry passengers over the Mersey. It was one of those foggy mornings when you can scarcely see your hand before you; but, in spite of the obscurity, Shandon could make out the figure of some stranger advancing towards him, and as he got nearer, saw it was a little stout man, with a bright jovial face and kindly eye, who came up, and seizing both his hands, shook them so heartily in his own, in such an impulsive, familiar, free-and-easy style, that a Frenchman would have said he came from the sunny south.

BUT though the newcomer was not a Southerner, he made a narrow escape of it, for he was full of talk and gesticulation, and seemed as if he would explode unless he came out with all he thought. His small intellectual eyes and large mobile mouth were safety-valves to let out the steam, and he talked and talked so incessantly that Shandon was fairly overpowered. He made a shrewd guess, however, who this voluble little man was, and, taking advantage of a momentary pause, managed to say, "Doctor Clawbonny, I presume?"

"Himself in person, my good sir. Here I have been seeking you for a whole quarter of an hour, and asking everybody for you everywhere. Only imagine my impatience! Five minutes more, and I should have lost my wits. It is really Richard Shandon I see. You actually exist? You're not a myth? Your hand, your hand, that I may grasp it in mine. Yes, it is a genuine flesh and blood hand, and there is a veritable Richard Shandon. Well, come, if there's a chief officer, there must be a brig called the *Forward* that he commands; and if he commands, she is going to sail, and if she's going to sail, she will take Dr. Clawbonny on board."

"Yes, Doctor, surely. There is a brig called the *Forward*, and she is going to sail, and I am Richard Shandon."

"That's logic," said the Doctor, drawing a long breath, "that's logic, and I am overjoyed to hear it, for now I have reached the summit of my ambition. I have waited long, and wished to go on a voyage; and now with you to command—"

"Allow me," interrupted Shandon.

But Clawbonny took no notice, and went on, "With you we are sure of pushing onward, and never yielding an inch of our ground."

"But sir," began Shandon again.

"You are a tried man, sir; you have seen service. You have a right to be proud."

"If you will please allow me to—"

"No, I will not allow your skill, and bravery, and hardihood to be underrated even by you. The captain who has chosen you for his chief officer knows his man, I'll be bound."

"But that's not the question," said Shandon, impatiently.

"Well, and what is the question, then? Don't keep me in suspense, pray."

"You won't let me speak. Please to tell me, Doctor, how you came to join in the expedition of the *Forward*."

"Well, it was through a letter which I have here from the brave captain, a very laconic one, though it says all that is necessary."

And drawing the said letter out of his pocket, he handed it to Shandon, who read as follows:—

INVERNESS, Jan. 22nd, 1860.

"If Dr. Clawbonny is willing to embark in the brig *Forward*, let him present himself to the chief officer, Richard Shandon, who has received orders concerning him."

"The Captain of the *Forward*, K. Z.

"To Dr. Clawbonny, Liverpool."

"The letter came this morning, and here I am ready to go on board."

"But, at any rate," said Shandon, "you know where we are going, I suppose?"

"Not I; but what does it matter to me, so long as I go somewhere? People call me a learned man, but they are much mistaken. I know nothing, and if I happen to have published some few books which sell pretty well, they are not worth anything, and it is very good of the people to buy them. I know nothing, I tell you, except that I am an ignoramus. Now I have a chance of completing, or rather recommencing, my studies in medicine, in surgery, in history, in geography, in botany, in mineralogy, in conchology, in geodesy, in chemistry, in natural philosophy, in mechanics, in hydrography. Well, I accept the offer, and don't need much pressing, I assure you."

"Then you know nothing about the destination of the *Forward*?" said Richard, in a disappointed tone.

"I know this much, Mr. Shandon, that she is going where there will be much to learn and discover, and much to instruct us, for we shall come across other nations with different customs from our own; she is going, in short, where I have never been."

"But you know nothing more definite than that?" exclaimed Shandon.

"I have heard some talk of her going to the North Seas. So much the better if we are bound for the Arctic."

"But don't you know the captain?" asked Shandon again.

"Not at all; but he is a brave fellow, you may be sure."

By this time the steamer had arrived at Birkenhead, and Clawbonny and Shandon landed on the pier, and at once repaired to the shipbuilding-yard. The sight of the brig almost made the little doctor beside himself with joy, and he went subsequently every day to look at her on the stocks.

He made his abode with Shandon, and undertook the arrangement of the medicine-chest, for he was a duly qualified doctor and a clever man, though rather unpractical. At twenty-five years of age he was just an ordinary surgeon, but at forty he was a learned man, well known throughout the whole city, and a leading

member of the Literary and Philosophical Institute of Liverpool. He possessed a small private fortune, which enabled him to practice gratuitously in a great many cases, and his extreme amiability made him universally beloved. He never did an injury to a single human being, not even to himself. Lively and rattling as he was, and an incessant talker, he had an open heart and hand for everybody.

As soon as the news of his appointment to the *Forward* spread through the city, his friends besieged him with solicitations to remain at home. But their arguments and entreaties only made him more determined to go, and when the little man once got a crotchet in his brain no one could turn him from it.

On the 5th of February the *Forward* was launched, and two months later she was ready to go to sea.

Punctually to the time, on the very day fixed for his coming by the captain's letter, a large Danish dog made his appearance, sent by rail from Edinburgh to Richard Shandon's address. He was an ill-favored, snappish, unsociable animal, with a peculiar expression in his eye. A brass collar round his neck bore the name of the ship, and he was installed on board the same day, and a letter despatched to Leghorn to inform the captain of his safe arrival.

The crew of the *Forward* was now complete, with exception of the captain. It numbered the following individuals: 1. The Captain, K. Z. 2. The Chief Officer. 3. The Second Officer, James Wall. 4. Doctor Clawbonny. 5. Johnson, the boatswain. 6. Simpson, the harpooner. 7. Bell, the carpenter. 8. Brunton, the chief engineer. 9. Plover, the second engineer. 10. Strong, a colored man, the cook. 11. Foker, the ice-master. 12. Wolsten, the gunsmith. 13. Bolton, sailor. 14. Garry, sailor. 15. Clifton, sailor. 16. Gripper, sailor. 17. Pen, sailor. 18. Warren, stoker.

CHAPTER IV

The Dog-Captain

THE 5th of April brought the sailing day. Dr. Clawbonny's coming on board somewhat reassured people's minds, for where the learned Doctor went it must be safe to follow; but still the sailors seemed so restless and uneasy, that Shandon longed to be fairly out at sea, for he did not feel sure of any of them till they had lost sight of land.

Dr. Clawbonny's cabin was on the poop, which took up all the stern of the vessel. The captain's cabin and the chief officer's were on either side, overlooking the deck. The captain's remained hermetically closed after being furnished according to his written directions, and the key, as he ordered, was sent to him at Luebeck, so that no one could enter but himself.

This was a great vexation to Shandon, as it damped his ambitious hopes of getting sole command. In fitting up his own cabin, he took for granted they were going to the Arctic, and knowing, as he did, so thoroughly all that was required, he left nothing undone.

The cabin of the second mate was in the forecabin, where the men slept—a large, roomy place, with a stove

in the center, and every accommodation, for the sailors were treated as precious cargo on this vessel, and well provided for.

Dr. Clawbonny looked after himself, and he had had plenty of time, as he had taken possession of his cabin since the 5th of February, the day the *Forward* was launched.

"The happiest of the animals," he said, "would be a snail, who could make a shell to his own liking, and I mean to be an intelligent snail."

And truly his shell did him credit, for the Doctor took a perfect delight in arranging his scientific treasures. His books, and herbals, and cases, and mathematical instruments; his thermometer, and barometer, and hygrometers, and udometers*; his glasses, and compasses, and sextant; and maps and charts; and phials, and powders, and medicine-bottles—all were arranged and classified with an amount of order that might have shamed the British Museum. Inestimable riches were stored up in that small space of six feet square, and it must be owned the good Doctor was not a little proud of his sanctum, though three of his least corpulent friends would have sufficed to crowd it uncomfortably.

To complete the description of the *Forward* it need only further be said that the dog's-kennel was built right below the window of the mysterious cabin, but its savage inmate preferred wandering between decks and in the hold. It seemed impossible to make him sociable, nobody could do anything with him, and in the night his piteous howls would resound through the whole vessel.

What was the reason? Could it be grief for his absent master? or was it instinctive fear of the voyage? or did it bode approaching danger? This last was the common opinion among the sailors, and many a one joked over it, who verily believed the poor dog was an imp of the devil.

Pen, a coarse brutal fellow at all times, rushed so furiously at the beast one day that he fell right against the capstan, and split his head open frightfully. Of course this accident was laid to the "uncanny dog's account."

Clifton was the most superstitious of all the crew, and he made the singular discovery, that, whenever the animal was promenading the deck, he went to the side the wind was, changing his position as the ship tacked, just as if he had been the captain.

Dr. Clawbonny was so gentle and winning that he would have tamed a tiger, but all his attempts to get into this dog's good graces were in vain.

Besides, the animal would answer to none of the names borne by his canine brethren, so in the end he got called "Captain," for he appeared perfectly familiar with ship life. This was certainly not his first voyage, and more than one of the sailors fully expected to see him some day suddenly assume the human form, and begin giving orders in a stentorian voice.

Richard Shandon had no apprehensions on that score, though he had anxieties enough of another nature, and the night before sailing he had a long confidential talk

on the subject with the Doctor and his two officers.

The four sat comfortably together in the saloon indulging themselves with a glass of grog—a farewell glass, for, in accordance with the instructions received from Aberdeen, every man on board, from the captain down to the stoker, must be a total abstainer; that is to say, neither wine, nor beer, nor spirits would be allowed on board, except in case of illness, or when ordered by the doctor.

For more than an hour they had been talking over the departure of the ship next day, for if the captain's words were verified, the morning would bring a letter containing final instructions.

"I hope," said Shandon, "that if this letter doesn't give us the name of the captain, it will tell us at least the destination of the ship, or how shall we know which way to steer?"

"Goodness me!" exclaimed the impatient doctor, "were I in your place I should be off even if no letter came; it will find its way to us by hook or by crook, I'll warrant."

"You stick at nothing, Doctor. But pray, how should we direct our course then?"

"Towards the North Pole, most assuredly. That's a matter of course; it doesn't admit of a doubt."

"Not admit of a doubt!" said Wall; "and why not towards the South Pole?"

"The South Pole! Never! Would the captain ever dream of exposing a brig to all the difficulties of crossing the broad Atlantic?" said the Doctor.

"You say go to the North," continued Shandon, "but that's a wide word. Is it to be to Spitzbergen, or Greenland, or Labrador, or Hudson's Bay? It is true enough that all these routes lead to the same impassable fields of ice; but that doesn't remove the necessity of choosing one or the other, and I should be greatly puzzled to decide upon which. Can you help me, Doctor?"

"No," replied the loquacious little man, vexed at having no answer ready. "But the question is just this, if you don't get a letter, what will you do?"

"I shall do nothing; I shall wait."

"You won't sail!" cried Clawbonny, aghast at the possibility.

"No, not I."

"That's the wisest way," said Johnson, quickly, while the Doctor rose, and began pacing the floor, for he was too agitated to sit still. "Yes, that's the wisest way, and yet too great delay might be attended with bad consequences. In the first place, this is a good time of the year; and if north it is to be, we ought to take advantage of the breaking up of the ice to get past Davis Strait. Then, again, the men are getting more restless every day; their friends and old shipmates are constantly urging them to leave the *Forward*; and if we wait much longer we may find ourselves in a pretty fix."

"That's quite true," added James Wall; "and if once a panic got amongst the crew, they would desert to a man, and I very much doubt if you would succeed in getting fresh hands."

"But what's to be done, then?" asked Shandon.

*Rain gauges.

"Just what you said," replied the Doctor, "wait; but wait till to-morrow before you begin to despair. Every one of the captain's promises have been kept hitherto, and there is no ground for believing that we shall not be told where we're going when the right time comes. For my own part, I have not the slightest doubt that we'll be in full sail to-morrow on the Irish Sea, so I vote that we have one more glass of grog, and drink to our safe voyage. It certainly has a rather mysterious beginning, but, with such sailors as you, a thousand chances to one but we'll have a prosperous ending."

"And now, sir, if I may give you my advice," said Johnson, "I would give orders to be ready to sail to-morrow, that the crew may not imagine there is any uncertainty. To-morrow, whether a letter comes or not, I would weigh anchor. Don't light the fires, for the wind bids fair to keep steady, and we shall be able to get out easily with the tide. Let the pilot come on board and we'll get over to Birkenhead, and cast anchor off the point. This will cut us off from communication with the shore, and yet be near enough to allow of this wonderful letter reaching us, should it arrive after all."

"That's well spoken, my good Johnson," said the Doctor, holding out his hand to the old tar.

"Well, so be it, then," said Shandon, "and now good-night." They each retired to their respective cabins, but were too excited to sleep much, and were up again by sunrise.

THE morning letters had all been delivered, but not one came for Richard Shandon. Still he went on with his preparations for sailing, and, as we have seen, the news had spread over Liverpool and brought together an unusual concourse of spectators. Many came on board to give a farewell embrace to a friend, or a last entreaty not to go, and some to gratify their curiosity by looking over the vessel, and trying once more to discover its real destination. But they found the chief officer more taciturn and reserved than ever, and went off grumbling.

Ten o'clock struck, and eleven; at one o'clock the tide would turn. Shandon stood on the poop gazing with uneasy troubled looks at the crowd.

It was a cloudy day and the waves were dashing high outside the basin, for there was a pretty strong south-east wind blowing, but this could not prevent them getting easily out of the Mersey.

Twelve o'clock struck and no letter. Dr. Clawbonny began to walk impatiently up and down, staring about through his eye-glass, and gesticulating in the most excited manner. Shandon bit his lips silently till the blood came.

Presently Johnson came up to him and said, "If we are to sail with this tide, sir, we have no time to lose; for it will take us a full hour to get out of the docks."

Shandon threw a last look round, consulted his watch, and said briefly, "Go."

This monosyllabic reply was enough for Johnson. He gave immediate orders for all visitors to go ashore, and the sailors began to haul in the ropes. There was a simultaneous rush towards the side of the vessel.

The general confusion which ensued was greatly increased by the furious yelping of the dog, and reached a climax when the animal made one sudden bound from the fore-castle right into the midst of the crowd, who fled before him right and left. He gave a loud deep bark, and jumped on the poop, carrying a letter between his teeth. Incredible as the fact may appear, it could be confirmed by at least a thousand eye-witnesses.

"A letter!" exclaimed Shandon. "Then *he* is on board."

"*He* has been, there is no doubt, but he is not now," replied Johnson, pointing to the deck, which was quite clear of all strangers.

"Captain! Captain!" called the Doctor, trying to take the letter out of his mouth; but the dog resisted stoutly, and was evidently determined to give the message to none but the right party.

"Here, Captain!" shouted Shandon; and at once the beast sprang forward and passively allowed him to withdraw the anxiously-expected missive, giving three loud, clear barks, which were distinctly heard amid the profound silence on the ship and on the quay.

Shandon held the letter in his hand without opening it, till the Doctor exclaimed, impatiently, "Do, pray, read it."

The letter bore no postmark, and was simply addressed, "To the Chief Officer, Richard Shandon, on board the brig *Forward*." Shandon opened it, and read as follows:—

"You will steer your course towards Cape Farewell. You will reach it on the 20th of April. If the captain does not come on board, you will go through Davis's Strait, and up Baffin Bay to Melville Bay.

"The Captain of the *Forward*.

"K. Z."

Shandon carefully folded up this laconic epistle, put it in his pocket, and gave orders to sail.

The *Forward* was soon out of the basin, and, guided by a Liverpool pilot, got out of the Mersey, the crowd hurrying along the Victoria Docks to have a last glimpse as she passed by. The fore- and mainsails were soon hoisted, and the brig, with a speed worthy of her name, rounded Birkenhead Point, and glided swiftly away into the Irish Sea.

CHAPTER V

Out at Sea

THE wind was favorable, though very variable, and full of sudden squalls, and the *Forward* cut her way rapidly through the waves. At five o'clock the pilot gave up his charge into Shandon's hands, jumped into his boat, and was soon out of sight.

Johnson was right. Once fairly out at sea, there was no more trouble with the sailors. They fell into regular ways at once, and in their admiration of the ship's good qualities, forgot the mystery hanging round her.

The little Doctor almost lived on deck, gulping down the sea air as if he could never be satisfied. He would walk up and down in the stormiest weather, and, for

a man of learning, his *sea legs* were pretty fair. "The sea is a beautiful thing to look at," he said to Johnson, coming on deck after breakfast. "I am rather late in beginning my acquaintance with it, but I'll soon make up for it."

"You are right, Dr. Clawbonny. I wouldn't give one fag-end of sea for all the continents in the world. People say that sailors soon grow tired of their calling, but here have I been, forty years at sea, and I enjoy it as much as I did the first day."

"And what a pleasure there is in feeling a good ship under your feet; and, if I'm any judge, the *Forward* is a regular 'brick.'"

"You are quite right there," said Shandon, coming up at that moment; "it is a well-built ship, and I must confess I have never seen one better provisioned and equipped for an Arctic expedition. That reminds me, thirty years ago, Captain Ross, going in search of the North-West passage—"

"Went in the *Victory*," interrupted the Doctor, "a brig of nearly the same tonnage as ours, and with a steam-engine, too?"

"What! Do you know all about it?"

"Don't I?" said the Doctor. "Steam was then in its infancy, and the engine on the *Victory* caused much injurious delay. Captain Ross, after vainly trying to repair it, ended by doing away with it altogether, and left it behind in his first winter quarters."

"Why, Doctor," exclaimed Shandon, "I see you are quite familiar with all the facts."

"I ought to be," replied the Doctor, "for I have read the narratives of Parry, and Ross, and Franklin, and the reports of McClure and Kennedy, and Kane, and McClintock; and then one thing I recollect—this same McClintock's vessel, called the *Fox*, was a screw brig, like ours, and he succeeded in gaining his object in a more direct and easy manner than any of his predecessors."

"That is perfectly true," said Shandon. "This McClintock was a brave sailor. I have seen him at work; and you may add that, like him, we shall be in Davis Strait before April is out; and if we can manage to get past the ice, it will greatly shorten our voyage."

"At all events," returned the Doctor, "I hope we'll be better off than the *Fox* was in 1857, for she got blocked in among the ice to the north of Baffin Bay the very first year, and had to stay there all the winter."

"We'll hope for better luck, Mr. Shandon," said Johnson; "and, certainly, if we can't get on with a ship like the *Forward*, we had better give up trying for good and all."

"Besides," said the Doctor, "if the captain is on board, he will know what's to be done better than we do in our complete ignorance, for this wonderfully laconic letter of his gives us no clue to the object of the voyage."

"We know what route to take, at any rate," said Shandon, rather sharply, "and that is a good deal. We can manage now, I should think, to do without supernatural interventions and instructions for a full month at least."

"Also, you know my own opinion of this captain."

The Doctor laughed, and said, "I thought with you, once, that he would put you in command of the ship, and never come on board; but now—"

"But what?" said Shandon in a snappish tone.

"But since the arrival of this second letter my views on the subject are somewhat modified."

"And pray why, Doctor?"

"Because, though the letter tells you what course to take, it does not tell you the destination of the *Forward*. Now, he must know where we are going, and I should like to know how a third letter can be sent to you when we are out in the middle of the sea. On the shores of Greenland the postman would certainly be a *rara avis*. What I think, Shandon, is, that our gallant captain is waiting for us at some Danish settlement at Holsteinberg or Upernavik. He will have gone there to complete his cargo of seal-skins, and to buy his sledges and dogs—in fact, to get everything ready that is required for a voyage to the Arctic Seas. I shall not be at all surprised to see him walk out of his cabin some fine morning, and give orders to the officers in the most ordinary matter-of-fact fashion imaginable."

"Possibly," said Shandon, dryly; "but meantime the wind is freshening, and it is not very prudent to risk a topmast in a stiff breeze." This broke off the conversation, and he walked away immediately, and bade the men reef sails.

"He sticks to his notion," said the Doctor to Johnson.

"Ay, and more's the pity," said the boatswain, "for you may be right, Mr. Clawbonny."

Towards evening on Saturday, the wind changed to a hurricane, and almost drove the ship against the Irish coast. The waves were very high, and the brig rolled and pitched so heavily, that if the Doctor had felt inclined to be seasick, he would have had every excuse. At seven they lost sight of Cape Malinhead on the south. This was the last glimpse of Europe, and more than one of the brave crew of the *Forward*, destined never more to return, stood gazing with long, lingering look. The gale ceased towards nine at night, and the brig continued her course towards the northwest.

During the hurricane, Richard Shandon had closely studied his men, analyzing each individual, as every captain ought to do, that he may know what characters he has to work with, and be on his guard. James Wall was a most devoted officer but he was deficient in the initiative faculty; he could understand and obey, but that was all; he was only fit for a third-rate position. Johnson, an experienced old Arctic sailor, had nothing to learn in the way of *sang froid* and boldness. Simpson, the harpooner, and Bell, the carpenter, were reliable men, slaves of duty and discipline.

The ice-master, Foker, a sailor brought up in Johnson's school, would be a valuable man.

Of the other sailors, Garry and Bolton appeared the best. Bolton was a lively, chattering fellow. Garry was about thirty-five years of age, an energetic-looking young man, but rather pale and sad.

The three sailors, Clifton, Gripper, and Pen, were

less enthusiastic and resolute. They were rather fond of grumbling; and Gripper would have given up his engagement, even at the last moment, if he had not been ashamed. So long as things went well, and there was not much work to do, and no danger to risk, he might reckon on these three well enough; but they needed to be well fed. They took very badly to the teetotal regimen, though they knew beforehand it was to be enforced, and whenever the meal-time came round they were always regretting their brandy or gin, though they made up for it by drinking huge bowls of tea and coffee, which might be had almost *ad libitum* on board.

As for the two engineers, Brunton and Ployer, and the stoker Warren, they had sat with folded arms hitherto: their work had not begun.

Shandon knew now how much each man could be depended on.

ON the 14th of April the *Forward* crossed the great current called the Gulf Stream, which runs along the eastern shore of the American continent as far as the Banks of Newfoundland, and then curves south-east to the coast of Norway. They found they were in latitude $51^{\circ} 37'$, and longitude $20^{\circ} 58'$, about 200 miles from Greenland. The weather had become cold, and the thermometer had fallen to 32° —that is, to the freezing point.

The Doctor had not yet donned his winter costume, but he had followed the example of the sailors and officers, and put on an oil-skin jacket and trousers, and a big "sou'-wester," and high boots, into which he dropped all of a lump; and really, to see him on deck when the rain was falling in torrents, and the waves dashing over the vessel, he might have been taken for some marine animal, though the comparison would not have flattered his vanity.

For two days the weather was extremely unfavorable, the wind was southwest, and the *Forward* could make no way. From the 14th to the 16th the sea continued rough and stormy; but on the Monday a violent shower came, the result of which was an almost immediate calm. Shandon pointed out this peculiar phenomenon to the Doctor, who replied:

"It quite confirms the curious observations made by Scoresby, a Fellow of the Royal Society of Edinburgh, of which I have the honor to be a corresponding member. You see that during rain the waves are less susceptible to the action of the wind, even when violent. On the contrary, in dry weather, the sea is easily agitated by a comparatively slight breeze."

"But how do you account for this?"

"That is easily answered. I don't account for it at all," said the Doctor.

Just at that moment the ice-master, who was on watch at the mast-head, signaled a floating mass on the starboard side, about fifteen miles to leeward.

"An iceberg in these latitudes!" exclaimed the Doctor.

Shandon pointed his glass in the given direction, and confirmed the announcement of the pilot.

"That's strange!" said the Doctor.

"Does that astonish you?" asked the chief officer, smiling. "What! we are actually fortunate enough to find something that astonishes you!"

"Well, it astonishes me, and yet it doesn't," replied the Doctor, smiling, "for, in 1813, the brig *Anne*, of Poole, got blocked in among ice-fields in the forty-fourth degree of north latitude, and Dayement, her captain, counted icebergs by hundreds."

"Capital!" said Shandon; "you can still find something to tell us about it that we don't know."

"Oh! not very much," was the modest reply of the amiable little man, "except that icebergs have been met with in still lower latitudes."

"I know that, my dear Doctor, without your telling me, for when I was cabin-boy aboard the *Fly*, a sloop-of-war—"

"In 1818," interrupted the Doctor, "at the end of March or we might say April, you passed between two great islands of floating ice in the forty-second degree of latitude."

"Really, you're too bad, Doctor!" exclaimed Shandon.

"But it is true. I have no reason to be astonished, then, at finding a floating iceberg in front of our ship, seeing we are ten degrees farther north."

"I declare, Doctor, you're a perfect well; we have only to let down the bucket."

"All right. I shall dry up sooner than you think; and now, all I want to make me the happiest of doctors is to see this curious phenomenon a little nearer."

"Precisely," said Shandon. "Johnson," he added, calling to his boatswain, "it seems to me the wind is getting up."

"Yes, sir," said Johnson, "we are losing speed, and the currents from the Straits of Davis will soon begin to affect us."

"You are right, Johnson; and if we want to be at Cape Farewell by the 20th of April, we must put on steam, or we shall be dashed against the coast of Labrador. Mr. Wall, will you give orders for the fires to be lighted immediately?"

His orders were executed forthwith, and in another hour the steam had acquired sufficient power to turn the screw, and the *Forward* was racing along on the wind with close-reefed sails at full speed.

CHAPTER VI

The Great Polar Current

BEFORE long, the numerous flights of birds—puffins, petrels, and others peculiar to these desolate shores—indicated that they were approaching Greenland. The *Forward* was steaming rapidly north, leaving leeward a long cloud of black smoke.

On Tuesday, the 17th of April, the ice-master signaled the *blink* of ice about twenty miles ahead, at least. A radiant band of dazzling whiteness lighted up all the surrounding atmosphere, in spite of somewhat heavy clouds. Experienced Arctic sailors cannot mistake this appearance; and the old hands on

board at once pronounced it to be the luminous reflection from a field of ice about thirty miles in the distance.

Towards evening the wind fell south, and became so favorable that Shandon was able to dispense with steam, and depend once more on the sails.

On the 18th, at three o'clock, an ice-stream was discovered in the far horizon, making a broad shining white line between sea and sky. It was evidently drifting more from the east coast of Greenland than from Davis Strait; and about an hour afterwards the brig encountered it, and sailed right through the loose floating masses.

On the morrow, at daybreak, a ship was descried, which proved to be the *Valkyrien*, a Danish corvette, going to Newfoundland. The current from the Strait began to be sensibly felt, and Shandon was obliged to crowd sail to get on at all.

He was standing on the poop with his two officers and the Doctor, examining the force and the direction of the current, when the Doctor asked if it was true that this same current was uniformly found in Baffin Bay.

"Undoubtedly that's the case," replied Shandon; "and sailing vessels have great difficulty in making head against it."

"All the more," said James Wall, "as they fall in with it, both on the east side of America, and on the west side of Greenland."

"Well, then," said the Doctor, "that is quite an argument in favor of a North-West passage. This current travels at the rate of about five miles an hour, and one can hardly suppose it has its origin in the bottom of the bay."

"Here is another fact to confirm your reasoning. This current goes from north to south; but in Bering Strait there is a contrary current going from south to north, which must be the origin of this."

"That certainly proves that America is completely detached from the Polar regions, and that the waters of the Pacific flow round its coast, and fall into the Atlantic. Besides, the superior elevation of the Pacific makes it all the more likely that the European seas would be fed by its waters."

"But, surely," said Shandon, "there must be some facts to support this theory. Hasn't our learned Doctor any to tell us?" he added, half ironically.

"Oh, yes!" said Clawbonny, with a good-humored air of complacency, "I could tell you this, which may interest you, that whales which have been wounded in Davis Strait have been captured subsequently on the coast of Tartary with the European harpoon still sticking in their sides."

"And since they have neither doubled Cape Horn nor the Cape of Good Hope, they must have got round North America. That is proof positive, Doctor."

"If you're not convinced yet, my good Shandon, I can bring forward other facts, such as the driftwood which so abounds in Davis Strait—larches, and aspens, and tropical substances. Now, we know that this south current would prevent this driftwood from enter-

ing; if it comes out there, it must have got in by Bering Strait, for there is no other way."

"I am quite satisfied, Doctor; one couldn't be long incredulous with you."

"Look out!" exclaimed Johnson; "here comes something quite *a propos* to our conversation. I see a jolly-sized log of wood floating there, and I propose we fish it up, with out chief officer's leave, and ask what country it comes from."

Shandon agreed, and soon after the log was hauled up on board, though with considerable difficulty. It was a trunk of mahogany, worm-eaten to the very center, which accounted for its floating.

"Here's a triumphant proof," exclaimed the Doctor, enthusiastically. "Since it cannot have been carried into Davis Strait by the Atlantic currents, and since it cannot have been driven into the Polar basin by any of the North American rivers, seeing that it grew just below the Equator, it is evident it comes in a direct line from Bering Strait. Besides, look at the worms. They belong to a species peculiar to the tropics. Listen, I'll tell you the whole history of this log. It was carried into the Pacific Ocean by some river, from the Isthmus of Panama or Guatemala. From thence it was borne along by the current into Bering Strait, and driven out into the Polar Sea. I should assign rather a recent date to its departure, for it is neither old enough nor soaked enough to have been long on the road. After getting through Baffin Bay, past that long succession of straits, it was violently caught up by the Polar current, and brought through Davis Strait, to take its place on board the *Forward*, for the special delectation of Dr. Clawbonny, who now craves permission to keep a piece of it as a specimen."

"By all means," said Shandon; "but allow me to tell you that you are not the only possessor of a waif like this. The Danish governor of the Isle of Disko, on the coast of Greenland——"

"I know," said the Doctor. "He has a table made of a trunk picked up in similar circumstances. I know all about it, Shandon; but I don't envy him his table for there is enough there to make me a whole bedroom suite, if it were worth the trouble."

During the night the wind blew with extreme violence, and the driftwood became more frequently visible. It was a time of the year when any approach to the shore would be dangerous, as the icebergs are very numerous. Shandon therefore gave orders to lessen sail, and take in all that was not absolutely necessary.

The next business was to give out warm clothing for the crew, as the thermometer went down below freezing point. Each man received a woollen jacket and trousers, a flannel shirt, and wadmel stockings, like those worn by the Norwegian peasants. Each man was also provided with a pair of perfectly waterproof sea-boots.

As for "Captain," he was quite contented with his natural covering. He did not seem to feel the change of temperature, and, likely enough, had been accustomed to it before. Moreover, a born Dane can hardly complain of cold; and "Captain" was wise enough not to expose himself much; he was seldom visible, gener-

ally stowing himself away in the darkest recesses of the ship.

Towards evening, through a rift in the fog, the coast of Greenland was indistinctly visible—the Doctor just caught a glimpse through the glass, of peaks and glaciers, and then the fog closed over it again, like the curtain falling at the theater at the most interesting part of the play.

On the 20th of April the *Forward* sighted a fallen iceberg, a hundred and fifty feet high. It had been in the same place from time immemorial, and had become firmly fixed below; as, for every foot above water, an iceberg has nearly two below, which reckoning would give this a depth of about sixty fathoms. No thaw seemed to have affected it, or touched its strange outlines. It was seen by Snow; by James Ross, in 1829, who made an exact drawing of it; and by Lieutenant Bellot, in 1851. The Doctor, of course, was anxious to carry away some souvenir of an ice mountain so celebrated, and succeeded in sketching it very successfully.

At last Cape Farewell came in sight, and the *Forward* arrived on the day fixed, amidst snow and fog, with the temperature at 12°. If the unknown captain should chance to turn up here, he certainly could not complain.

"Here we are, then," said the Doctor, "at this famous cape! Well named it is, for many have reached it like us who never saw it more. Do we, indeed, say farewell to our friends in Europe? Frobisher, Knight, Barlow, Vaughan, Scroggs, Barentz, Hudson, Blossville, Franklin, Crozier, Bellot—all passed this way, some never to return! For them it was indeed a Cape Farewell."

All the past history of Greenland rose up to memory, as the Doctor stood gazing over the side of the ship.

CHAPTER VII

Davis Strait

DURING the day the *Forward* bored her way easily through the loose ice. The wind was favorable, but the temperature very low, owing to the passage of the air currents over the ice-fields.

The night was the most trying time, requiring the utmost vigilance. The icebergs so crowded the narrow strait that upwards of a hundred could often be counted on the horizon at one time. They were constantly being shed off by the glaciers on the coast, through the combined action of the waves and the April weather, and either melted away or floated away over the ocean. It was necessary, also, to guard against coming into collision with the driftwood, which was floating about in continuous heavy masses, so the "crow's nest" had to be attached to the topgallant mast-head. This was a cask with a movable bottom, in which the ice-master took up his position, to keep a sharp look-out over the sea. Here he was partially sheltered from the wind, and could both give notice of any ice that came in sight and direct the course of the vessel through it when necessary.

The nights were short. The sun had reappeared since the close of January, and inclined more and more to show himself above the horizon; but the snow came

between, and though not exactly causing darkness, making navigation a work of difficulty.

On the 21st of April, Cape Desolation came in sight through the fog. The men were worn out with fatigue, for they had not a minute's rest since they got in among the ice. It was found necessary to have recourse to steam to bore a way through the close, heavy packs.

The Doctor and the boatswain were standing at the stern, having a chat, while Shandon was in his cabin, trying to get a few hours' sleep. Clawbonny was very fond of having a talk with the old sailor, for he had made so many voyages, and seen and heard so much, that his conversation was always sensible and interesting. The Doctor took quite a fancy to him, and Johnson heartily reciprocated his liking.

"How different this country is from all others," said Johnson. "It is called Greenland, but certainly it is only during a very few weeks in the year that it justifies its name."

"But who knows, my good fellow, whether in the tenth century it might not have been justly called so? More than one total change like that has taken place on our globe; and perhaps I shall astonish you considerably when I tell you that, according to Icelandic chronicles there were two hundred flourishing villages on this continent eight or nine hundred years ago."*

"You astonish me so much, Mr. Clawbonny, that I couldn't believe it for it is a miserable country."

"Miserable it may be, but for all that it affords enough to satisfy the inhabitants, and even civilized Europeans, too."

"True enough. Both at Disko and Upernavik we shall find men who have taken up their abode in this inhospitable climate; but, for my part, it has always seemed to me that their stay there must be a matter of necessity rather than of choice."

"I can quite think that, yet a man can get used to anything; and the Greenlanders don't appear to me so much to be pitied as the laboring classes in our great cities. They may be badly off, but one thing is certain, they are not unhappy. I say badly off; but that does not quite express my meaning. What I would say is, they lack many comforts to be found in the temperate zones, and yet their constitutions are so adapted to this rude climate, that they find a measure of enjoyment in it which we cannot even imagine."

"I suppose it is so, Mr. Clawbonny, since Heaven cannot be unjust; but I have been here many a time, and yet I never can see these dreary solitudes without a feeling of sadness coming over me. And then what names they have given to these capes, and bays, and headlands! Surely they might have found something more inviting than Cape Farewell and Desolation. They have not a very cheering sound to navigators."

"I have thought the same thing myself," replied the Doctor; "and yet these names have a geographical in-

*The ruins of houses and many graves are still to be seen there. Recently investigations have been made, and relics from the tombs have been collected by Danish archeologists. One theory about the name is that it was called Greenland to attract settlers from Iceland.

terest attaching to them which we must not overlook. They record the adventures of those who gave them. If I find Cape Desolation among such names as Davis, Baffin, Hudson, Frobisher, Ross, Parry, Franklin, and Bellot, I find soon afterwards Mercy Bay. Cape Providence is good company for Port Anxiety; Repulse Bay leads me to Cape Eden; and Turnagain Point to Refuge Bay. Here I have before me the whole succession of dangers and disappointments, obstacles, and successes, despairing failures, and accomplished results, linked with illustrious names of my countrymen; and as if on a series of ancient medals, I read in this nomenclature the whole history of these seas."

"You have certainly made out a very good case for it, Mr. Clawbonny. I only hope, in our voyage, we may oftener come to Success Bay than Cape Despair."

"I hope that, too, Johnson; but, tell me, have the crew got over their fears at all?"

"They have partly, sir; and yet, to speak frankly, since we entered the strait, their heads are full again of this eccentric captain of ours. More than one of them expected him to make his appearance the moment we reached Greenland, and there's no sign of him yet. Between ourselves, Mr. Clawbonny, are you not surprised?"

"I certainly am, Johnson."

"Do you believe in the actual existence of this captain?"

"Most assuredly."

"But what can possibly induce him to act in this manner?"

"WELL, if I say what I really think, it is this—the captain wished to get the sailors too far on to be able to back out of the undertaking; and if he had shown himself on board ship when we were going to sail, I don't know how he would have managed at all, with everybody clamoring to know the destination."

"Why not?"

"My stars! if he is going to attempt some superhuman enterprise, and try to push his way where human feet have never trod, do you suppose he would have found a crew at all to go with him? But by going to work like this, he has dragged the men on so far, that going farther becomes a necessity."

"That's very possible, Mr. Clawbonny. I have known more than one bold adventurer, whose mere name would have been enough to prevent anyone from joining any expedition led on by them."

"Anyone except me," said the Doctor.

"And me, after you, Doctor," replied Johnson. "No doubt, then, our captain belongs to these daring adventurers. Well, we shall see, I suppose. When we reach Upernavik, or Melville Bay, I daresay our brave incognito will quietly install himself on board, and in-form us where he has a fancy to drag the ship."

"I think that is very likely; but the difficulty is to get to Melville Bay. Just look at the ice all around us. There is hardly room for the ice to get through. See that immense plain stretching out yonder!"

"In our Arctic language, Mr. Clawbonny, we call that

an *ice-field*—that is to say, a surface of ice which extends beyond the reach of sight."

"And what do you call this broken ice on the other side—those long pieces which keep so closely together?"

"That's a *pack*. If the loose masses assume a circular form, we call it *palch*; and if elongated, a *stream*."

"And all that floating ice, there—has that any particular name?"

"That is called *drift ice*. If it rose higher out of the water it would be *icebergs* or *ice-hills*. It is dangerous for ships to come into contact with them, and they have to be carefully avoided. Look! do you see that protuberance, or sort of ridge of broken ice on the surface of the field? That is called a *hummock*, and is formed by the collision of *fields*. If its base was submerged, it would be called a *calf*."

"Well, it is certainly a curious spectacle," said the Doctor, "and one that acts powerfully on the imagination."

"Yes, indeed," replied Johnson, "for the ice often assumes the most fantastic forms."

"For instance, Johnson," interrupted the Doctor, "look at that assemblage of huge blocks. Couldn't you fancy it was some eastern city, with its minarets and mosques glittering in the pale moonlight? And then a little way off is a long succession of Gothic arches, which remind one of Henry the Seventh's Chapel at Westminster, or the Houses of Parliament."

"Ay, Mr. Clawbonny, each man shapes those to his own fancy; but I can tell you both churches and towers are dangerous places to live in, or even to get too near. There are some of those minarets tottering at their base, and the smallest of them would crush our brig to pieces."

"And yet men have dared to venture here without having steam to fall back upon. It is difficult to imagine a common sailing ship being able to pick her way through those moving rocks."

"It has been done, however, Mr. Clawbonny. When the wind became contrary, which happened to myself more than once, we anchored our ship to one of those blocks, and waited patiently, drifting along with it more or less, till a favoring breeze allowed us to resume our course again. I must confess, however, it was a very slow fashion of sailing. We did not get on farther in a whole month than we should have done in a day, if we had at all a fair wind."

"It strikes me," said the Doctor, "that the temperature keeps getting lower."

"That would be vexing," said Johnson, "for we need a thaw to loosen these packs and make them drift into the Atlantic. The reason they are so numerous in Davis Strait is the narrowness of the space between Cape Walsingham and Holsteinberg; but after we get beyond the 67th degree, we shall find the sea more navigable during May and June months."

"Yes; but how to reach it is the question."

"That's it, Mr. Clawbonny. In June and July we should have found the passage open, as the whalers do; but our orders were positive—we were to arrive here in April. That makes me think that our captain is some

thorough 'go-ahead' fellow who has got an idea in his head, and is determined to carry it out. He would not have started so soon if he had not meant to go a long way. Well, if we live we shall see."

The Doctor was right about the temperature. The thermometer was only 6° at mid-day, and a breeze was blowing from the southwest, which, though it cleared the sky, considerably impeded the course of the ship, as the strong current it produced drove the loose, heavy masses of ice right across her bows. Nor did all these masses move in the same direction. Some—and those the largest among them—floated in an exactly opposite direction, obeying a counter-current below.

It is easy to understand what difficulty this caused in navigation. The engineers had not a single moment's rest. Sometimes a lead or opening was discovered in an ice-field, and the brig had to strain her utmost to get into it. Sometimes she had to race with an iceberg to prevent the only visible outlet from being blocked up; while again some towering mass would suddenly overturn, and the ship must be backed in an instant to avoid being crushed. Should frost set in, all the accumulation of floe-pieces driven into the narrow pass by the north wind, would consolidate firmly, and oppose an insurmountable barrier to the progress of the *Forward*.

The petrels and other sea-birds were innumerable. They were flying about in all directions, filling the air with their discordant cries. Amongst them was also a number of sea-gulls, with large heads, short necks, and compressed beaks, spreading their long wings, and disporting themselves in the loose snow. These feathered gentry quite enlivened the landscape.

The driftwood was still abundant, and the logs came dashing against each other with great noise. Several cachalots, or sperm whales, with enormous, massive heads, approached the vessel; but it was out of the question to think of giving them chase, though Simpson the harpooner's fingers itched to try to spear them. Towards evening, seals were also seen swimming about between the floes, the tips of their snouts just above water.

On the 22nd, the temperature became still lower. The steam had to be at high pressure to enable the *Forward* to gain any favorable lead whatever. The wind kept steadily northwest, and the sails were close-reefed.

Being Sunday, the sailors had less work. After morning service, which was read by Shandon, the crew occupied themselves in shooting guillemots, a species of northern auks. They caught a great number, which were dressed according to Clawbonny's receipt, and furnished an agreeable addition to the ordinary fare of both officers and men.

At three o'clock in the afternoon the *Forward* reached the Kin of Zaal, and the Sukkertop, or Sugarloaf—a wild, lonely peak, rising 3,000 feet above the shore. There was a heavy swell in the sea, and from time to time a dense fog would suddenly overspread the gray sky. However, at noon the observations had been taken, and it was found that the latitude was 65° 20', and longitude 54° 22'. Two degrees higher had

therefore to be made before a more open sea could be reached.

For the three following days it was one continuous struggle with the floes. It was a fatiguing business to work the engine: the steam was cut off every minute, and escaped hissing from the safety valve.

While the fog lasted, the approach of icebergs could only be known by the hollow detonations produced by the avalanches. The brig had then to turn aside at once, for there was danger of coming into collision with fresh-water blocks, as hard as rock, and remarkable for their crystal transparency. Shandon took care to replenish his supply of water by shipping several tons of these every day.

The Doctor could never get accustomed to the optical illusions caused by refraction. For instance, an iceberg twelve miles off looked like a little white mass quite close; and his eye needed long training to enable him to judge objects correctly in a region where a phenomenon like this was of frequent occurrence.

At length, what with forcing the brig along in field ice and driving back threatening blocks with long poles, the crew were completely worn out, and yet on Friday, the 27th of April, the *Forward* was still outside the Polar circle.

CHAPTER VIII

What the Crew Thought About It

BY watching the chance, however, and taking advantage of every favorable lead, the *Forward* managed to gain a little ground, but instead of avoiding the enemy, it was evident that direct attack would soon be necessary, for ice-fields, many miles in extent, were approaching, and as these masses, when in motion, represent a pressure of more than ten millions of tons, great care was requisite to avoid nippings, that is, getting crushed in among them on both sides of the ship. The saws were ordered to be brought up and placed in readiness for immediate use.

It was hard work now for the crew, and some began to grumble loudly, though they did not refuse to obey, while others took things as they came with philosophic indifference.

"I couldn't tell for the life of me what brings it into my head just this moment," said Bolton gayly, "but I can't help thinking of a jolly little grog-shop in Water Street, where a fellow can make himself very comfortable with a glass of gin and a bottle of porter. You can see it, too, quite plain, can't you, Gripper?"

"Speak for yourself," said Gripper, in the surly tone he generally adopted. "I can see nothing of the sort."

"It's only a way of speaking, Gripper; of course I didn't suppose that those ice-cities which Mr. Clawbonny so admires have even one solitary little public-house in them, where a brave Jack Tar can get a tumbler or two of brandy."

"You may be quite sure of that, Bolton; and for that matter you might add, there is nothing even to be had on board to keep a poor fellow's heart up. A queer idea, certainly, to forbid spirits to Arctic sailors!"

"I can't see that," said Garry, "for you remember what the Doctor said, that it was absolutely necessary to avoid all stimulants if a man wished to go far north, and keep well and free from scurvy."

"But I have no wish to go far north, Garry. I think it is all lost labor, even coming this length. I can't see the good of being so bent and determined on pushing through where the Fates are dead against us."

"Ah, well, we shan't push through, anyway," said Pen. "And I think I have even forgotten the taste of gin!"

"You must comfort yourself, my boy," said Bolton, "with what the Doctor said."

"Oh, it's all very fine to talk," said Pen, in his coarse, brutal voice, "but it remains to be seen whether all this stuff about health isn't a mere sham to save the rum."

"Pen may be right, perhaps, after all," said Gripper.

"Pen, right!" exclaimed Bolton. "His nose is too red for that, and if this new regimen is beginning to bring it back to its natural color a bit, he may thank his stars instead of complaining."

"What harm has my nose done to you, I should like to know?" said Pen, angrily, for this was an attack on his weak point. "My nose can take care of itself; it doesn't want your advice. Mind your own business."

"Come, Pen, don't get rusty. I didn't think your nose was so sensitive. Why, man, I like a good glass of whisky as well as other people, especially in such a climate as this, but if it does one really more harm than good, I am quite willing to go without it."

"You do without it?" said Warren, the stoker, "but I am not so sure that everyone on board does without it."

"What do you mean, Warren?" said Garry, looking fixedly at him.

"I mean this, that for some reason or other, there are spirits on board, and I don't believe some folks in the cabin don't make themselves jolly."

"Pray, how did you know that?" asked Garry.

Warren could not answer; he was only talking for talk's sake, as the saying is.

"Never mind him, Garry," said Bolton. "You see he knows nothing about it."

"Well," said Pen, "we'll go and ask for a ration of gin from the chief officer. We've earned it well, I'm sure, and we'll see if he refuses."

"I advise you to do nothing of the sort," rejoined Garry, seriously.

"Why not?" asked Pen and Gripper.

"Because you'll only get 'No' for an answer. You knew the regulation when you signed the articles. You should have thought about it sooner."

"Besides," replied Bolton, who always sided with Garry, "Richard Shandon is not the master; he has to obey like all the rest of us."

"Obey whom, I should like to know?"

"The captain."

"Confound the captain," exclaimed Pen. "Can't you see through all this make-believe. There is no more any real captain than there is any tavern among

those ice-blocks. It's only a polite fashion of refusing us what we have a right to demand."

"But there is a captain," replied Bolton, "and I would wager two months' wages that we shall see him before long."

"So much the better," said Pen. "I, for one, should like to say a few words to him."

"Who's talking about the captain?" said a fresh interlocutor.

It was Clifton who spoke—an anxious, superstitious man.

"Any more news about the captain?" he asked.

"None," was the unanimous reply.

"Well, some fine morning I quite expect to find him in his cabin, without anyone knowing how he got there, or where he came from."

"Be off with you," said Bolton. "You seem to think the captain is a sort of brownie, like those that the Scotch Highlanders talk about."

"Laugh as much as you like, Bolton, but that won't change my opinion. Every day, when I pass his cabin, I take a look through the key-hole, and you see if I don't come and tell you some day what he looks like, and how he's made."

"Plague take him," said Pen; "I suppose his timbers are no different from other people's; and if he's going to try and force us where we don't want to go, he'll soon show us what stuff he is made of."

"That's pretty good," said Bolton. "Here's Pen, who doesn't even know the man, wanting to pick a quarrel with him directly."

"Doesn't know him?" returned Clifton; "that remains to be proved."

"What do you mean?" asked Gripper.

"I know what I'm saying."

"But we don't," was the common exclamation.

"Why, hasn't Pen quarreled with him already?"

"With the captain?"

"Yes, with the dog-captain, for it comes to the same thing."

THE sailors gazed dubiously at each other, hardly knowing what to say or think.

At last Pen muttered between his teeth, "Man or dog, as sure as I'm alive, I'll settle accounts with him one of these days."

"Clifton," asked Bolton, seriously, "do you actually profess to believe that the dog is the real captain? Johnson was only fooling you."

"I firmly believe it," said Clifton, with an air of perfect conviction, "and if you were to watch him as I have done, you would have seen his strange behavior for yourself."

"What strange behavior? Tell us about him."

"Haven't you seen the way he marches up and down the deck, and looks at the sails, as if he were on watch?"

"Yes, that's quite true; and one evening I positively caught him, with his fore-paws up, leaning against the wheel."

"Impossible!" said Bolton.

"And doesn't he leave the ship now every night, and

go walking about among the ice, without caring either for the bears or the cold?"

"That is true, too," said Bolton.

"Besides, is the animal like any other honest dog, fond of human society? Does he follow the cook about, and watch all his movements when he brings in the dishes to the cabin? Don't you hear him at night, when he is two or three miles from the ship, howling till he makes your flesh creep, which, by the way, isn't a very difficult matter in such a temperature. And, to crown all, have you ever seen him eat any food? He will take nothing from anybody. His cake is never touched, and unless someone feeds him secretly, I may safely say he is an animal that lives without eating. Now, you may call me a fool if you like, if that isn't peculiar enough."

"Upon my word," said Bell, the carpenter, who had listened to all Clifton's arguments, "it is not impossible you may be right."

The other sailors were silent, till Bolton changed the subject by asking where the *Forward* was going.

"I don't know," said Bell. "At a given moment, Shandon is to receive his final instructions."

"But how?"

"How?"

"Yes, how? that's the question," repeated Bolton.

"Come, Bell, give us an answer," urged the others.

"I don't know how," said the carpenter. "I can tell no more than you can."

"Oh! by the dog-captain, of course," exclaimed Clifton. "He has written once already; I daresay he can manage a second letter. Oh, if I but knew half that dog does, I should feel fit to be First Lord of the Admiralty."

"So, then, the short and long of it is, that you stick to your opinion, Clifton," said Bolton.

"I've told you that already."

"Well," said Pen, in a deep, hollow voice, "all I know is, if that beast don't want to die in a dog's skin, he had better be quick, and turn into a man, for I'll do for him as sure as my name is Pen."

"And what for?" said Garry.

"Because I choose," was the rude reply. "I am not bound to give an account of my doings to anyone."

"Come, boys, you have had talk enough," said Johnson, interrupting the conversation to prevent a quarrel. "Get to work; it is time the saws were all up, for we must get beyond the ice."

"So be it, and on a Friday, too. We shan't get beyond it quite so easily," said Clifton, shrugging his shoulders.

From what cause it was impossible to say, but all the efforts of the crew were in vain. That day the *Forward* made no way whatever, though she dashed against the ice-fields with all her steam up. She could not separate them, and was forced to come to anchor for the night.

Next day the wind was east, and the temperature still lower. The weather was fine, and, as far as the eye could reach ice-plains stretched away in the distance, glittering in the sun's rays with dazzling whiteness. At

seven in the morning, the thermometer stood eight degrees below zero.

The Doctor felt much inclined to stay quietly in his cabin, and devote himself to the reperusal of his volumes of Arctic voyages; but his custom was always to do whatever was most disagreeable to himself at the time being, and as it was certainly anything but pleasant to go on deck in such bitter weather and lend a helping hand to the men, he adhered to his rule of conduct, and left his snug, warm quarters below, and went upstairs to do his share of work in towing the vessel along. He wore green spectacles to protect his eyes; but from this time he began to make use of snow-spectacles, to avoid the ophthalmia so frequent in Arctic latitudes.

By evening the *Forward* had gained many miles, thanks to the activity of the men and the skill of Shandon. At midnight they cleared the sixty-sixth parallel, and on sounding, the depth was found to be twenty-three fathoms. Land was about thirty miles to the east.

Suddenly the mass of ice, which had hitherto been motionless, broke in pieces, and began to move. Icebergs seemed to surge from all points of the horizon, and the brig found herself wedged in among a crowd of moving bergs, which might crush her at any moment. The task of steering became so difficult that Garry, who was the best hand at the wheel, could never leave it. Ice-mountains were reforming behind the ship, and there was no alternative but to bore a way forward through the loose floes.

The crew were divided into two companies, and ranged on the starboard and larboard; each man armed with a long pole pointed with iron, to push back the most threatening packs. Before long, the brig entered a narrow pass between two high blocks, so narrow, that the ends of the yards touched the rock-like walls on either side. This led into a winding valley, full of whirling, blinding snow, where masses of drift ice were dashing furiously against each other, and breaking up into fragments with loud crackings.

But it was soon but too evident that there was no outlet to this gorge; an enormous block was right in front of the ship, and drifting rapidly down on her. There appeared no way of escape, for going back was impossible.

Shandon and Johnson stood together on the forepart of the vessel, surveying her perilous position; Shandon giving orders with one hand to the steersman and with the other to James Wall, who transmitted them to the chief engineer.

"How is this going to end, Johnson?"

"As Heaven pleases," was the boatswain's reply.

The ice-block, an enormous berg a hundred feet high, was now within a cable's length of the *Forward*, threatening her with instant destruction.

It was a moment of intense agonizing suspense, and became so unbearable that the men flung down their poles in spite of Shandon's commands, and hurried to the stern.

Suddenly a tremendous noise was heard, and a per-

fect waterspout broke over the deck. An enormous wave upheaved the ship, and the men cried out in terror—all but Garry, who stood up quietly at the helm, and kept the vessel in the right course.

But when the men recovered themselves a little, and ventured to look the gigantic foe in the face again, it was gone! The whole berg had completely disappeared, the pass was free, and there was a long channel beyond, lighted up by the oblique rays of the sun, which offered an uninterrupted passage to the *Forward*.

"Well, Mr. Clawbonny," said Johnson; "how do you explain this phenomenon?"

"It is one that often occurs, and is very simple, my good friend," replied the Doctor. "When these floating icebergs become detached at the time of the thaw, they sail separately along and preserve their equilibrium perfectly, but as they gradually drift farther south, where the water is relatively warmer, they begin to melt and get undermined at the base, and the moment comes when their center of gravity is displaced, and down they go. If this had happened two minutes later, however, it would have fallen on the ship and crushed her to atoms."

CHAPTER IX A Letter

THE Polar circle was entered at last. The *Forward* passed Holsteinberg at twelve o'clock on the 30th of April. Picturesque mountain scenery appeared on the eastern horizon, and the sea was open and free from icebergs, or rather any icebergs that were visible could easily be avoided. The wind was in the S. E., and bore along the brig in full sail up Baffin's Bay.

The day would have passed unmarked by any unusual incident but for the following occurrence, which, strange as it may appear, actually took place. At six in the morning, when Richard Shandon's watch was over, and he came back to his cabin, he found a letter lying on his table directed thus:

"To the chief officer, Richard Shandon,
"On board the *Forward*,
Baffin Bay."

Shandon could not believe his own eyes, and would not even take the letter in his hands till he had called the Doctor and James Wall and the boatswain to look at it.

"It is certainly very strange," said Johnson.

"I think it is charming!" exclaimed the Doctor.

"At any rate," replied Shandon, "we shall know the secret now, I suppose."

He tore open the envelope hastily and read as follows:

"The captain of the *Forward* is pleased with the coolness, skill, and courage displayed in recent trying circumstances by the crew and officers, and yourself. He begs you to convey his thanks to the men.

"You will please direct your course north to Melville Bay, and from thence attempt to make Smith Sound.

"The Captain of the *Forward*,
"K. Z."

"Monday, April 30th, off Cape Walsingham."

"And that's all!" exclaimed the Doctor.

"That's all," was Shandon's reply.

"Well!" said Wall, "this Quixotic captain doesn't even so much as speak of coming on board now. I infer from this he doesn't intend to come at all."

"But this letter," said Johnson, "how did it get on board the vessel?"

Shandon was silent.

"Mr. Wall is right," replied the Doctor, picking up the letter which had fallen on the floor, and giving it back to Shandon.

"The captain won't come on board for a very good reason."

"And what is it?" inquired Shandon, eagerly.

"Because he is there already!" said the Doctor flatly.

"Already! What do you mean?"

"If he is not, how do you explain the arrival of the letter?"

Johnson nodded his head approvingly.

"It is not possible!" exclaimed Shandon. "I know every one of the crew; and, if your idea were correct, the captain must have been on board ever since the ship sailed. It is perfectly impossible, I say; for there is not a man among them I haven't seen more than a hundred times in Liverpool during the last two years. No, no, Doctor; your theory is altogether inadmissible."

"Well, then, how do you account for it?"

"Any way but that. I grant you that the captain, or someone employed by him, may have taken advantage of the fog and darkness to slip on board unperceived. We are not far from land, and the Esquimaux kayaks glide along noiselessly between the icebergs. He might easily have managed to climb up the ship and deposit the letter. The fog has been quite dense enough for that."

"Yes, and dense enough, too, to keep anyone from seeing the brig; for if we could not notice an intruder coming on deck, it is not very likely he would be able to discover the vessel."

"I think that, too," said Johnson. "What do you say, Mr. Shandon?"

"Anything you like, except that he is one of the crew," said Shandon, in an excited manner.

"Perhaps it is one of the sailors who has been commissioned by him," suggested Wall.

"That may be," said the Doctor.

"But which of them?" asked Shandon. "I tell you, all the men have been personally known to me this long time."

"At any rate, the captain will be welcome whenever he chooses to come, be he man or fiend," said Johnson. "But there is one piece of information in the letter at all events. We are not only going to Melville Bay but to Smith Strait."

"Smith Strait," repeated Shandon, mechanically.

"It is evident," continued Johnson, "that the object of the *Forward* is not to seek the North-West passage, since we must leave Lancaster Sound, the only entrance to it, on the left. This supposes very difficult navigation for us in unknown seas."

"Yes," said Shandon, "Smith Sound was the course taken by the American, Dr. Kane, in 1853; and what dangers he encountered! He was given up for lost for a long time. However, if we are to go, we go. But where? To the Pole?"

"Why not?" asked the Doctor.

Johnson shrugged his shoulders at the bare possibility of such a mad attempt.

"Well, then," said Wall, "to come back to the captain; if he exists, I hardly see any place in Greenland where he can be waiting for us except Disko, or Upernavik, so in a few days at most we shall know better how the case stands."

"But, Shandon," asked the Doctor, "are you not going to tell the men about this letter?"

"With your leave, sir," said Johnson, addressing Shandon, "I say not."

"And why not?"

"Because anything so unheard-of and so mysterious dispirits the men. They are very uneasy as it is about the issue of this strange expedition, but if anything supernatural should occur, it might have the worst possible effect on them; and we could never rely on them when they may be most wanted."

"What is your opinion, Doctor?" asked Shandon.

"Johnson's reasoning seems convincing, I think," was the reply.

"And what say you, James?"

"I incline to Johnson, sir."

After a few moments' reflection, Shandon read the letter carefully again, and then said:

"Your opinion is very sensible, but excuse me, gentlemen, I cannot adopt it."

"Why not, Shandon?"

"Because my instructions are plain and precise. I am told to convey a message from the captain to the crew. All I have to do is to obey orders, however they may have come to me, and I cannot——"

"But, sir," interrupted Johnson, mainly concerned at the disastrous effect of any such communication on the sailors.

"My good fellow," said Shandon, "I can understand your opposition, but I put it to yourself, whether I have any option in the matter. Read the letter. 'He begs you to convey his thanks to the crew.'"

"Well, then," said Johnson, when his love of discipline was thus appealed to, "shall I assemble the men on deck?"

"Do so," replied Shandon.

THE news of the communication from the captain soon spread, and the sailors needed no second summons to hear the mysterious letter. They listened to it in gloomy silence, but gave way to all sorts of wild conjectures, as they dispersed to their work. The superstitious Clifton ascribed everything, as usual, to the dog-captain, and said triumphantly: "Didn't I say that animal could write?"

From this day forward he always took care to touch his cap whenever he chanced to meet him about the ship.

One thing was patent to the observation of anyone—the captain, or his ghost, was always watching over their doings, and prudent individuals began to think it advisable to keep quiet, and say as little about him as possible.

By observations taken at noon on the 1st day of May, the longitude was found to be 32° and the latitude 68°. The temperature had risen, and the thermometer stood at 26° above zero.

The Doctor was on deck, amusing himself with the gambols of a white bear and her cubs, on a pack of ice frozen fast to the shore. He tried to capture her, with the assistance of Wall and Simpson; but the brute was evidently of a peaceable disposition, for she never showed fight at all, but scampered off with her progeny at full speed.

Cape Walsingham was far astern and they sailed all night with a favorable breeze, and suddenly the high mountains of Disko rose to view. The Bay of Godhavn, where the Governor-General of the Danish settlements resided, was left on the right.

Isle Disko is also called Whale Island. It was from this place that Sir John Franklin wrote his last letter to the Admiralty, on the 12th of July, 1845, and it was there that McClintock touched on his return, on the 27th of August, 1859, bringing incontestable proofs of the loss of the expedition.

The shore was one continuation of icebergs, of the most peculiar fantastic shapes, so firmly cemented to the coast that the most powerful thaws had been unable to detach them.

Next day, about three o'clock, they sighted Sander-son Hope, to the N.E. Land was on the starboard side, about fifteen miles off, the mountains looking brownish-red in the distance. In the course of the evening, several whales of the species called *finbacks*, which have their fins on the back, were seen disporting themselves among the ice, blowing out large volumes of air and water through the apertures in the head.

During the night of the 5th of May, the Doctor observed the luminous disk of the sun, for the first time, appear completely above the horizon, though from the 31st of January to that date there had been constant daylight.

To those who are not accustomed to it, there is something in this continual day which excites wonderment at first, but soon gives place to weariness. One would hardly believe how necessary the darkness of night is for the preservation of the sight. The Doctor felt the constant glare of daylight positively painful, intensified as it was by the dazzling reflection of the ice.

On the 5th of May the *Forward* passed the seventy-second parallel. Two months later, she would have fallen in with numerous whalers about to commence their fishing, but at present the Strait was by no means free enough to allow their vessels to get into Baffin Bay.

The next day the brig arrived in sight of Upernavik, the most northerly of the Danish settlements on the coast.

CHAPTER X

Perilous Navigation

SHANDON, Dr. Clawbonny, and Johnson, accompanied by Foker and Strong, the cook, got into the whaling-boat, and went on shore.

The Governor, with his wife and five children, came courteously to meet their visitors. Dr. Clawbonny knew enough Danish to establish friendly relations between them, and Foker, the ice-master, who was also interpreter, knew about twenty words of the Esquimaux tongue, and a good deal can be done with twenty words if one is not very ambitious.

The Governor was born on Disko Island, and had never been out of it in his life. He did the honors of his town, which was composed of three wooden houses for himself and the three Lutheran ministers, a school, and a few shops, which were stocked by shipwrecked vessels. The rest of the town consisted of snow-huts, with one single opening, into which the Esquimaux crawled on all-fours.

A great part of the inhabitants had gone out to meet the *Forward*, and more than one advanced as far as the middle of the bay in his kayak.

The Doctor knew that the word *Esquimaux* means *eater of raw fish*, but he also knew that this name is considered an insult by the natives; and he therefore took care to call them "Greenlanders."

And yet their oily sealskin clothes and boots, and the greasy, fetid smell of both men and women—for one sex is hardly distinguishable from the other—told plainly enough the description of food on which they lived, as well as the disease of leprosy which prevailed to some extent among them, as it does among most ichthyophagous races, though it did not affect their health.

The Lutheran clergyman and his wife, with whom the Doctor was anticipating some pleasant intercourse, were on a visitation in the south, below Upernavik, so he was obliged to make the best of the Governor. This worthy functionary was not very lettered; a little less intelligence would have made him an ass; a little more, and he would have known how to read.

The Doctor also wished to make a personal inspection of an Esquimaux hut, but, fortunately for him, the entrance was too small to allow of his admission. It was a happy escape, for nothing can be more repulsive than the interior of a Greenland hut, with its heap of dead and living things, seal-flesh, and Esquimaux rotten fish, and stinking garments; not even a solitary window to purify the air; nothing but a hole at the top, which allows the smoke to escape, but not the fetid smell.

Shandon, meanwhile, was obeying the instruction of his unknown commander, and procuring means of transport over the ice. He had to pay £4 for a sledge and six dogs, and even then the natives wished to get out of their bargain. He also sought to engage the services of Hans Christian to manage the dogs, the same young man that accompanied the McClintock expedition, but found he had gone to the south of Greenland.

But the most important part of Shandon's business was to try and discover whether there was any European at Upernavik waiting for the arrival of the *Forward*. Was the Governor acquainted with any stranger, an Englishman most probably, who had taken up his abode in this region? When had he last had any intercourse with whalers or other vessels?

To these questions the Governor replied that not a single stranger had landed on the coast for more than ten months. It was evidently a hopeless mystery, and Shandon could not help crowing a little over the disappointment of the sanguine Doctor.

"You must own it is quite inexplicable," he said; "nothing at Cape Farewell, nothing at Disko Island, nothing at Upernavik."

"Wait a few days, and if it turns out there is nothing at Cape Melville either, I shall hail you as the only captain of the *Forward*."

Towards evening, the whale-boat came back to the ship, bringing Strong, the cook, with some dozens of eider-ducks' eggs, twice the size of common hens' eggs, and of a greenish color. His forage for fresh provisions had not been successful, but still the eggs were a very welcome addition to the salt junk.

The wind was favorable next day, but Shandon still delayed weighing anchor. He determined to wait till morning to give time for anyone to come on board that wished, and fired a salute from the cannon every hour to make known the presence of the vessel. It made a tremendous noise among the icebergs, but had no effect beyond frightening the mollymokes and roaches, who came flying out in clouds. Squibs and rockets in abundance were sent up during the night, but equally without result. There was no alternative but to proceed.

By six o'clock next morning the *Forward* had lost sight of Upernavik and its ugly posts all along the shore, with strips of seal intestines and paunches of deer hanging to dry. The wind was S.E., and the temperature had risen to 32°. The sun appeared through the fog, and the icebergs began to give way a little beneath his melting beams.

The white, dazzling reflections of his rays, however, had a disastrous effect on the men. Wolsten, the gunner, Gripper, Clifton, and Bell, were attacked with snow blindness, a very common disease in spring, and often terminating among the Esquimaux in total loss of sight. The Doctor advised everyone, and especially those suffering from the complaint, to wear a green gauze veil, and he was the first to follow his own prescription.

The dogs Shandon had purchased at Upernavik turned out rather wild at first, but they soon became used to the ship, and Captain got on very well with his new associates. He seemed no stranger to their ways, and, as Clifton was not slow to remark, he had evidently been among his Greenland brethren before.

AFTER leaving Upernavik, the appearance of the coast changed considerably. Immense glaciers stood out against the gray sky, and in the west, beyond

the opening of Lancaster Sound, vast ice-fields extended, ridged with hummocks at regular intervals. There was great danger of the brig becoming nipped, as each instant the leads got more impracticable. Shandon had the furnaces lighted, and till the 11th managed to pursue a winding course among the loose floes, but on the morning of the 12th, the *Forward* found herself beset on all sides. Steam proved powerless, and there was no alternative but to cut a way through the ice-fields. This involved great fatigue, and a mutinous spirit began to manifest itself in some of the crew, such as Pen, Gripper, Warren, and Wolsten. Certainly it was hard labor to saw through huge masses six and seven feet thick, and when this was accomplished, it was almost as hard to warp the vessel along by means of the capstan and anchors fixed in the ice in holes made with a center-bit. The broken ice, too, had to be constantly pushed back under the floes with long poles tipped with iron, to keep a free passage, and all this physical toil, amid blinding snow, or dense fog, combined with the low temperature, the ophthalmia, and the superstitious fears of Clifton, contributed to weaken the mental and bodily energy of the men.

When the sailors have to deal with a bold, intrepid, decided leader, who knows his own mind and what he intends to do, confidence is felt in spite of themselves; they are one in heart with their captain, strong in his strength and calm in his calmness. But the crew of the *Forward* were conscious of Shandon's irresolution and hesitancy, for, notwithstanding his natural energy of character, he betrayed his weakness by his frequent countermand of orders, by imprudent remarks, and in a thousand little things that did not escape the notice of his men.

The simple fact, besides, that Shandon was not the captain, was enough to make his orders matters of discussion, and from discussion to rebellion is an easy step.

Before long, the malcontents had won over the head engineer to their side, a man who had been hitherto a very slave of duty.

On the 16th of May, six days from the time the *Forward* had reached the ice-fields, Shandon had not made two miles farther north. This was a very serious aspect of affairs, for they were in imminent danger of being locked in till the next season.

About eight in the evening, Shandon and the Doctor, accompanied by Garry, went out on a voyage of discovery over the vast outstretching plains of ice. They took care not to go too far from the ship, for it would have been difficult to find the way back. The Doctor was quite amazed at the peculiar effects of refraction. He came to a place where he thought he had only to make a little jump, and found to his surprise he had five or six feet to leap over, or *vice versa*. In both cases a fall resulted. Though not dangerous, falling was painful on such a hard, slippery surface.

Shandon and his companions were in search of leads, or navigable openings, and in pursuance of this object, about three miles from the ship, they climbed, though with considerable difficulty, to the top of an iceberg,

above three hundred feet high. From this they had an extended view over a widespread heap of desolation. It was like gazing at the ruins of some mighty city, with its fallen obelisks and overturned towers and palaces. It was a veritable chaos, and far as the eye could see, not a single lead was visible.

"How shall we get through?" asked the Doctor.

"I don't know," replied Shandon, "but get through we must, even if we have to blast those mountains with powder. I certainly have no intention of being imprisoned in the ice till next spring."

"As the *Fox* was, just about this very same part," said the Doctor. "Bah! With a little philosophy, we shall get out, never fear. I would back that against all the engines in the world."

"One must confess things do not look very favorable this year."

"That is true enough. The aspect of the regions is much the same as it was in 1817."

"Do you suppose, then, Doctor, it is not always alike—the same to-day as it has always been?"

"Unquestionably I do, Shandon. From time to time sudden breakings up occur, which scientific men have never been able to explain. Till 1817 this sea was constantly blocked up, but in that year an immense cataclysm took place, which hurled the icebergs into the ocean, and many of them reached the Banks of Newfoundland. From that time Baffin Bay has been nearly free, and has become the rendezvous of numerous whalers."

"Then it is easier now for ships to go north?" asked Shandon.

"Immensely so," said the Doctor, "but it has been a subject of remark, that for some years past there has been a tendency in the Bay to refill and close again, an additional reason why we should push on with all our might; though, I must confess, we are much like a party of strangers going through unknown galleries, when each door closes behind as they pass through, and cannot be reopened."

"Do you advise me to go back?" asked Shandon, looking at the Doctor, as if he would read his inmost soul.

"I advise you to go back! No, I have never yet learned to put one foot behind the other, and I say *go on*, even should we never return; only, what I wish to impress on you is this, that if we set to work imprudently, we know the risks we incur."

"And what is your opinion Garry?" said Shandon.

"I should go right on, certainly, sir. I agree with Mr. Clawbonny. However, it rests with you entirely. Give your orders, we will obey."

"All don't say so, Garry," was Shandon's reply. "All are not in the mood to obey. Suppose they refuse? What then?"

"I have told you my mind," replied Garry coldly, "because you asked me, but you are not obliged to follow my advice."

Shandon made no response; but after carefully scanning the horizon once more, climbed down the iceberg again, followed by his two companions.

CHAPTER XI

The Devil's Thumb

DURING Shandon's absence, the crew had been busily engaged in various attempts to lessen the pressure of the ice. This task was entrusted to Pen, Clifton, Bolton, Gripper, and Simpson, in addition to the two engineers and the stokers, who had to take their share of work as sailors, now that their services were not required at the engine.

"I tell you what," exclaimed Pen, angrily, "I have had enough of this, and I swear that if the ice does not break up within three days, I'll fold my arms, and not do another hand's turn!"

"Fold your arms!" said Gripper; "you had far better use them to get back. Do you suppose we are inclined to stay here all the winter till next spring?"

"Truly it would be a dismal place to winter in," said Plover, "for the vessel is exposed on all sides."

"And who knows," asked Brunton the engineer, "whether the sea will be a bit more open next spring than it is to-day?"

"It isn't a question of next spring," replied Pen; "this is Thursday, and if the passage is not open by Sunday morning, we turn around and go south."

"That's a sensible speech," said Clifton.

"Do you go in for that?" inquired Pen.

"Yes," was the unanimous reply.

"And it is only just," said Warren; "for if we are obliged to work in this fashion, and work the ship along by main force, my opinion is that our labor would be better spent in dragging it back."

"We shall see that on Sunday," said Wolsten.

"Let me get orders," said Brunton, "and I'll soon light the furnaces."

"As for that," returned Clifton, "we can light them ourselves."

"If any one of the officers," continued Pen, "has a fancy to winter here, he is quite at liberty. He'll find no difficulty in making a snow-hut for himself, where he can live like a regular Esquimaux."

"That's out of the question, Pen," said Brunton, "we cannot leave anyone behind; and, what's more, I don't think the chief officer will be difficult to persuade. He seems very uneasy now, and if we propose the thing quietly to him—"

"That remains to be seen," said Plover. "Richard Shandon can be a hard, obstinate man when he likes; we must feel our way carefully."

"Only to think," said Bolton, eagerly, "that in a month's time we might be back in Liverpool. We shall easily get over the ice-belt down south. Davis Strait will be open at the beginning of June, and we have only to get right out into the Atlantic."

"We have this to take into account besides," said the prudent Clifton, "that, in getting Shandon to come back with us, we act on his responsibility, and our shares and bounty money are sure; whereas, if we return alone, it is at least doubtful if we get them."

"But suppose the officers will not go back?" resumed Pen, bent on pushing the question to the extreme.

There was no reply for a moment, and then Bolton said: "We shall see when the time comes; all we have to do now is to win over Richard Shandon to our side, and I don't think that will be difficult."

"There is one on board, at all events, I'll leave behind," said Pen, with a frightful oath, "though he should eat my arm off."

"That dog?" said Plover.

"Yes, that dog; and I mean to do for him before I am much older."

"The sooner the better," replied Clifton, never weary of his favorite subject. "He is the cause of all our misfortunes."

"I believe he dragged us into the ice," said Gripper.

"Ay, and gathered it up like this in front of us, for such compact masses are never seen at this time of the year," added Wolsten.

"It is through him my eyes are so bad," said Brunton, wearily.

"And through him we have neither gin nor brandy," said Pen.

So the men went on, each one having his own grievance against the dog.

"Worst of all," said Clifton, "he is the captain!"

"A curse of a captain he is too!" exclaimed Pen, in a paroxysm of senseless rage. "Well, he determined to come here, and here he shall stay."

"But how shall we get hold of him?" said Plover.

"Now's our chance," replied Clifton; "Shandon is not on board; Wall is asleep in his berth; and the fog is so thick that Johnson will never see us."

"But the dog?" interrupted Pen.

"Captain is lying asleep this moment close beside the coal-bunker," replied Clifton; "if anyone chooses to—"

"I'll undertake to get him," cried Pen in a fury.

"Take care, Pen; he has grinders that can break iron bars."

"If he stirs, I'll rip him up," declared Pen, taking up a knife, as he rushed down between decks, followed by Warren, who wished to have a hand in the business.

Both came back presently, carrying the dog in their arms, muzzled and tied up. They had surprised him in his sleep, and escape was impossible.

"Hurrah for Pen!" exclaimed Plover.

"And now what's to be done with him?" inquired Clifton.

"Drown him, and see if he ever makes his appearance again," replied Pen, with a grim smile of satisfaction.

About two hundred paces from the ship was a seal-hole, a circular opening made by the animals, out of which they come to breathe at certain intervals, basking on the surface of the ice, retreating below when danger approaches.

Pen and Warren directed their course to this hole, and, in spite of the poor dog's vigorous struggles, succeeded in plunging him into the sea, pitilessly placing an immense block of ice afterwards over the opening, to deprive him completely of all hope of release from his liquid prison.

"A good voyage to you!" shouted the cruel Pen as he returned to the vessel with Warren, unperceived by

Johnson, for in addition to the thick fog the snow had commenced to fall heavily.

About an hour afterwards Shandon and his two companions came back. Shandon had discovered a single lead to the north-east, and determined to take advantage of it. The crew obeyed his orders with alacrity, for three days still remained; and, moreover, they wished to prove the impracticability of proceeding farther north.

Sawing the ice and tracking went on busily during a part of that night and all next day, and the *Forward* had gained two miles.

On the 18th they sighted land, and came within five or six cables' length of a singular peak, called, from its strange shape, the Devil's Thumb.

At the very same place the *Prince Albert*, in 1851 and the *Advance*, with Dr. Kane, in 1853, were caught in the ice and detained for several weeks.

It was a dismal spot. The weird, fantastic form of the towering peak, the dreary, desolate surroundings, the ominous crackings of the glaciers, echoing and re-echoing over the distant plains, and the vast encircling icebergs, some of them three hundred feet high, invested the whole region with peculiar gloom, and Shandon felt no time must be lost in getting out of it. By dint of strenuous efforts, in twenty-four hours he had pushed on about two miles; but this was not enough. Yet what was to be done? He felt as if his energies were paralysed by the false position in which he was placed, and a sort of shrinking fear began to creep over him, for he knew that he could not carry out the instructions of his unknown captain, without exposing the ship to great danger. The men were worn out. It took them more than three hours to cut a passage twenty feet long through floes four or five feet thick, and their health was already seriously impaired. Shandon was also uneasy at the silence of the crew and their unusual zeal; he dreaded it might be the calm which precedes a storm.

Imagine, then, the painful surprise and disappointment, even the despair, which he felt to find, through an insensible movement of the ice-fields, the *Forward* lost in one night the ground she had gained at the cost of so much fatigue. On the morning of Saturday, the 18th, they were right in front of the Devil's Thumb again, in a more critical position than before, for the icebergs had increased, and passed like phantoms through the fog.

SHANDON was completely unnerved. His intrepid heart failed him, and he, like his men, quaked for fear. He had heard of the disappearance of the dog, but did not dare make any inquiry, lest a mutiny should break out.

It was terrible weather that day. A whirlwind of snow and thick mist wrapped the brig in an impenetrable veil. Occasionally the violent tempest would dispel the fog for an instant and disclose to the terrified gazer the gaunt, spectral form of the Devil's Thumb. Nothing could be done or even attempted except to anchor on an immense floe, for the darkness momen-

tarily increased, and the man at the wheel could not even see the officer on watch at the bows.

Shandon retired to his cabin, a prey to the most tormenting anxieties. The Doctor employed himself in arranging his notes, and the sailors lounged about the deck, or betook themselves to the fore-castle. The hurricane increased, and, through a sudden rift in the fog, the Devil's Thumb appeared slowly rising higher and higher.

"Good Heavens!" exclaimed Simpson, starting back in dismay.

"What's the matter?" asked Foker.

He needed no answer; for terrified outcries were heard on all sides—one exclaiming, "It is going to crush us!" and another, "We are lost!" and a third called loudly for Mr. Wall and Shandon, who speedily obeyed the summons. The Doctor followed, and for a minute all three stood in silent amaze.

It was a most alarming spectacle. Through a partial opening in the fog, the Devil's Thumb seemed quite close to the ship; its size increased to colossal magnitude, and on the summit a second cone appeared, point downwards, as if pivoted on the first, oscillating to and fro, and apparently about to fall on the brig and crush her beneath its enormous weight. Instinctively, everyone drew back, and several of the sailors jumped down on the ice and left the ship.

"Every man to his post," shouted Shandon, in stern tones. "No one is to leave the ship."

"Don't be afraid, my friends," said the Doctor. "there is no danger. It is simply the effect of the mirage, Mr. Shandon and Mr. Wall."

"You are right, Mr. Clawbonny," said Johnson. "These silly fellows are terrified at a shadow!"

Most of the sailors came back at the Doctor's reassuring words, and fear gave place to admiration, as they stood gazing at the marvelous phenomenon, which only lasted a few minutes longer.

"They call that a mirage," said Clifton, "but take my word for it, some fiend has to do with it."

"That's sure and certain," said Gripper. But the rift in the fog had revealed to Shandon's eyes a favorable lead, and he determined to profit by it without delay. He placed the men on each side of the opening. The hawsers were thrown out to them, and the work of tracking commenced.

They went on for many long hours, and Shandon had the furnaces lighted to use all available means of getting rapidly on.

"It is a providential chance," he said to Johnson, "and if we can only make a few miles farther, we may be out of difficulties. The men are in a mind to work, for they are glad to get clear of the Devil's Thumb, so we will take advantage of their mood as long as it lasts."

All of a sudden the brig ceased moving.

"What's wrong, Wall?" asked Shandon. "Any of the ropes broken?"

"No, sir," said Wall, looking over the side, "but the sailors are all running helter-skelter towards the ship, and here some of them are climbing up the side as if

they were completely out of their wits with fright." "What's the matter?" called Shandon, coming towards the bows.

"Let us on board! Let us on board!" exclaimed the sailors in panic-stricken tones.

Shandon looked towards the north and shuddered.

A strange-looking animal, with smoking tongue hanging out of enormous wide open jaws, was bounding towards the ship, and had come within a cable's length of her. He seemed more than twenty feet high; his hair stood on end, and his formidable tail, fully ten feet long, swept the snow and sent it flying in thick clouds. He was evidently in pursuit of the sailors, and the apparition of such a monster was enough to scare the bravest.

"It is a bear!" said one.

"It is a dragon!" exclaimed another.

"It is the lion in the Revelation!" suggested a third, while Shandon ran to his cabin and seized a loaded pistol. The Doctor armed himself with a revolver, and stood ready to fire at the huge animal, who seemed, from his enormous size, to belong to the antediluvian world.

The beast came nearer, making tremendous leaps, and Shandon and the Doctor discharged their weapons simultaneously. An unlooked-for result followed. The sudden explosion shook the atmosphere and changed the entire aspect of things.

The Doctor burst out laughing, and said, "Refraction again!"

"Refraction!" exclaimed Shandon.

But the crew shouted "The dog! the dog-captain!" and Pen thundered out, "Ah! it is the dog, always that cursed dog!"

And the dog it really was, who had snapped his cords and managed to get out on the ice again at another seal-hole.

Refraction, which is common enough in Arctic latitudes, had made him assume these formidable dimensions, while the vibration in the atmosphere had restored him to his original proportions. But this occurrence had a bad effect on the sailors, who were by no means disposed to accept a purely physical explanation of it. The strange phenomenon at the Devil's Thumb, and the reappearance of the dog under such peculiar circumstances, brought things to a climax, and loud murmurings were heard on all sides.

CHAPTER XII Captain Hatteras

THE *Forward* steamed rapidly along through the open channel. Johnson took the wheel himself, and Shandon kept a vigilant look-out on the horizon. His joy was of short duration, for he soon saw that the channel terminated in a circle of ice mountains.

However, he determined to go on and take his chance, rather than turn back.

The dog ran beside the brig on the ice, but kept a good distance off. Strangely enough, however, if he

got too far behind, a peculiar whistle was heard, which recalled him immediately.

The first time this whistle was noticed, the sailors were all on deck. They looked about, but no stranger could be seen far or near, and yet the whistle was distinctly repeated several times.

Clifton was the first to sound an alarm.

"Do you hear that?" he asked; "and, look, how the animal bounds along when he is called."

"It is quite incredible," replied Gripper.

"This finishes it," exclaimed Pen. "I'll go no farther."

"Pen is right," said Brunton. "It is tempting Heaven."

"Tempting the fiend!" replied Clifton. "I'd rather lose my share than go another step."

"We shall never return," said Bolton, in a dejected tone.

It was clear the crew were ripe for mutiny.

"Not another step! Are we all agreed on that?"

"Yes!" was the unanimous reply.

"Well, then," said Bolton, "let us go to Shandon; I'll be spokesman."

Off they went in a body to the poop.

The *Forward* was just entering at that moment a vast amphitheatre, perhaps about eight hundred feet in diameter, without a single outlet save the passage by which they had reached it.

Shandon felt he had imprisoned his ship and himself, but what was to be done? A heavy responsibility rested on his shoulders.

The Doctor folded his arms and silently gazed at the surrounding ice-walls, the average height of which was three hundred feet.

At that moment Bolton came up with his friends, and said in a voice trembling with excitement:

"Mr. Shandon, we cannot go farther."

"You say that to me?" exclaimed Shandon, his cheek crimsoning with passion.

"We say this, we have done enough for our invisible captain, and we have made up our minds to go no farther."

"You have made up your minds? You speak like that, Bolton? Take care."

"Your threats won't hinder us," said Pen, rudely.

Shandon had made a few steps towards this rebellious crew, when Johnson came up to him and said in a low voice:

"If we wish to get out of this, there is not an instant to lose. An iceberg is fast nearing the channel, which may completely block it up, and keep us here prisoners."

After a brief survey, Shandon turned towards the men and said:

"You shall give an account of this conduct to me by-and-by. Meantime, turn about the ship."

The sailors rushed to their posts. The *Forward* shifted rapidly. Fresh fuel was supplied to the furnaces, and the engine worked at high pressure, for everything depended on speed. It was a race between the brig and the iceberg.

"Put on more steam!" shouted Shandon, and the engineer obeyed at all risks, almost endangering the safety of the brig; but his efforts were in vain. The iceberg had been caught by some deep-sea current, and was bearing down fast towards the passage. The brig was still more than three cables' length off when the berg entered, and, adhering firmly to the ice on either side, shut up the outlet entirely.

"We are lost!" exclaimed Shandon, imprudently.

"Lost!" re-echoed from the crew.

"Let each take care of himself!" said one.

"Try the boats!" said another.

"Let's go to the stores!" said Pen. "If we are to be drowned, we may as well drown ourselves in gin."

The general disorder had reached its highest pitch, and broken all bounds. Shandon felt himself powerless. His tongue seemed palsied, and the power of speech forsook him. The Doctor paced up and down in an agitated manner, while Johnson folded his arms, and maintained a stoical silence.

Suddenly a loud, commanding, impressive voice thundered out the words:

"Every man to his post. Stop the ship!"

Johnson instinctively obeyed, and it was high time, for the *Forward* was steaming along at such a rate, that, before another minute, it must have dashed against the icy walls.

But Johnson was the only man that obeyed. Shandon, Clawbonny, and the entire crew, even the stoker and the cook, assembled on deck, and they all saw a man coming out of the captain's cabin, the mysterious cabin, so closely locked hitherto, the key of which was in the captain's sole possession. This man was none other than the sailor Garry.

"Sir," said Shandon, turning pale. "Garry, you—what right have you to command?"

"Duk!" called Garry, giving the same identical whistle which had so perplexed the crew.

At the sound of his right name, the dog gave one bound on to the poop, and stretched himself quietly at his master's feet. Not one of the crew said a word. The possession of the key, the dog sent by him, which now proved, as it were, his identity, together with the tone of command, which it was impossible to mistake, had a great effect on the minds of the men, and sufficed to establish Garry's authority.

Besides, Garry was hardly recognizable. He had shaved off his big whiskers, and his face appeared more impassive than before, and more energetic and imperious. He was dressed now as befitted his rank, and had the air of one who was accustomed to command.

THE crew were quite taken by storm, and, with sailor-like mobility of character, burst out in loud cheers for the captain, who desired Shandon to muster them in order, as he wished to inspect them. When they were all drawn up in file, he passed along in front of them and had a suitable word to say to each, treating them according to their past conduct.

Then he mounted the poop, and in a calm voice said:

"Officers and sailors, I am an Englishman like yourselves, and my motto is that of Admiral Nelson, 'England expects every man to do his duty.'"

"As an Englishman I am unwilling, we are unwilling, that any should be braver than ourselves, and venture where we have not been. As an Englishman it vexes me, it vexes us, that others should have the glory of penetrating the Arctic regions farther than we had ever penetrated them. If ever human foot shall tread on polar ground, it must be the foot of an Englishman. See, yonder waves your country's flag! I have fitted out this ship, I have consecrated my fortune to this enterprise, I will consecrate my life and yours to it, but that flag shall float over the North Pole. Have no fear. For each degree north you make from this day you shall receive £1,000 sterling. We have only reached the 72nd yet, and there are 90. My name will guarantee my good faith. I am Captain Hatteras!"

"Captain Hatteras!" exclaimed Shandon.

This name had an ominous sound, for he was well known among sailors as a man who stuck at nothing to gain his end, and had little regard for his own or any other man's life.

"And now," resumed Hatteras, "let the brig be anchored to icebergs, and order the furnaces to be put out. Each man resume his usual occupation; and, Shandon, I wish to speak with you in my cabin. I must talk matters over with you and the Doctor, and Johnson and Wall. Boatswain, dismiss the men."

And who was this Hatteras? He was the only son of a brewer in London, who was left an immense fortune. He went to sea in early youth, notwithstanding his brilliant prospects, not because he had any love for the merchant service; but because he had a great longing after geographical discoveries. He was lean and wiry in body, like most men of sanguine temperament, of average height, well-knit frame, and muscles like iron; with a calm, rigid face, and thin, compressed lips, and cold, though fine eyes, he looked the very personification of a man who would stick at nothing. He was one who would never draw back from what he had begun, and who would stake other men's lives as deliberately as he would his own. People had need to think twice before committing themselves to any of his projects.

John Hatteras had all the pride of an Englishman to excess. It was he that said one day to a Frenchman, who, with true national courtesy, tried to pay him a compliment, by declaring that if he had not been a Frenchman he should have wished to be an Englishman: "And I, sir, if I had not been an Englishman, should have wished to be an Englishman."

The speech showed the man. His most ardent desire was that his country should have the monopoly in geographical discoveries, and it was a great grief to him that in the fifteenth and sixteenth centuries England had no place in the glorious phalanx of navigators. True, in modern times she can boast her roll of illustrious names; but that was not enough to satisfy Hatteras; he must needs invent a country to have the honor of finding it. He had remarked the fact, that

though the English were far behind in respect of discovery, there was one corner of the globe where their efforts seemed concentrated—the Arctic regions. He was not content with the successful search for the North-West Passage; the pole itself must be reached, and he had twice made the attempt in vessels equipped at his own expense. To accomplish this was the one purpose of his life.

After several prosperous voyages in the southern seas, Hatteras made his first venture north by Baffin Bay, in his sloop, the *Halifax*, but did not succeed in getting higher than the 74th degree of latitude. The sufferings of his crew were frightful, and his foolhardy daring was carried to such a pitch that the sailors had little inclination for another voyage under such a captain.

However, in 1850, Hatteras equipped a schooner, the *Farewell*, and managed to enlist twenty gallant fellows in his service, but only by throwing out the tempting bait of high wages. It was at that time that Dr. Clawbonny wrote to him, requesting to take part in the expedition; but the post of surgeon was already filled, and fortunate it was for the Doctor.

The *Farewell* pushed as far north as the 76th degree, but there she was forced to winter. The crew were exposed to so many hardships, and the cold was so intense, that not a man survived but John Hatteras himself, and he was rescued by a Danish whaler, after a march across the ice of two hundred miles.

His return alone produced a great sensation in Liverpool. Who would ever dare to accompany Hatteras again in his mad attempts? Yet he himself never despaired, and his father just then died, leaving him a nabob's fortune.

In the interim, a brig, the *Advance*, manned by seventeen men, and commanded by Dr. Kane, was sent out by Grinnell, an American merchant, for the discovery of Franklin. It got as far, by Baffin Bay and Smith Strait, as the 82nd degree—nearer the Pole than any previous adventurers had ever gotten.

The vessel was American, Grinnell was American, Kane was American. This fact was a great grief to Hatteras, and the mortification of being outstripped by the Yankees rankled in his heart. He resolved that, come what might, he would distance them all and reach the Pole.

For two years he had been living in Liverpool, preserving a strict incognito. He passed for a sailor; he discovered the man he wanted in Richard Shandon, and made proposals both to him and Dr. Clawbonny by anonymous letters. The *Forward* was built, manned, and equipped. Hatteras took care to keep his name a secret, for he would not have found a single sailor to follow him. He determined not to take command of the brig unless compelled by imperative necessity, and not till the crew had gone too far to recede. He had also, as we have seen, kept such tempting offerings as glittering gold in reserve, that the poor fellows could not have refused to follow him to the world's end.

And to the world's end, indeed, it was that he vowed to go.

Now that affairs had come to a crisis, John Hatteras hesitated no longer to proclaim himself openly. His dog, the faithful Duk, who had been the companion of his voyages, was the first to acknowledge him, and happily for the brave, and unhappily for the timid, it was settled beyond dispute that the captain of the *Forward* was John Hatteras.

CHAPTER XIII

Captain Hatteras Discloses His Plans

THE unexpected appearance of this bold personage did not produce the same effect on all the crew. Some rallied round him, completely attracted by his daring or by the love of money. Others were willing to join in the adventure, while reserving to themselves the right of protest at some future time. Besides, it would be no easy matter to resist such a man.

The 20th was on a Sunday, and was kept as a day of rest for all on board.

A council of officers was held by the captain in his cabin, comprising Shandon, Wall, Johnson, and the Doctor. "Gentlemen," said Hatteras, in the gentle yet commanding tone peculiar to him, "you are aware of my project to reach the north pole. I desire to know your opinion as to our chance of success."

"My business, captain, is not to think, but to obey," said Shandon, coldly.

Hatteras showed no surprise at such a retort, but replied equally coldly: "Richard Shandon, I request your opinion as to our chance of success."

"Well, captain," was the answer, "facts will speak for me. Every attempt of the kind has hitherto failed; I hope we may be more fortunate."

"We shall be," said the captain. "And you, gentlemen, what do you think of it?"

"For my part," returned the Doctor, "I think your plan is practicable, and as it is evident that some day or other the pole will be reached by navigators, I don't see why it should be impossible for us."

"And there are also reasons why it should be so," resumed Hatteras; "all our measures have been adopted with a view to that end, and we shall profit by the experience of our predecessors. By the way, Shandon, thank you for your painstaking care in the equipment of the ship. There are, to be sure, a few black sheep among the crew that I must take in hand; but, on the whole, I have nothing but praise to bestow."

Shandon bowed stiffly. He felt his false position acutely. Hatteras understood his silence, and did not press him further.

"As for you, gentlemen," he continued, addressing Wall and Johnson, "I could not have the co-operation of braver or more experienced officers."

"Anyhow, captain, I'm your man," replied Johnson; "and though I must say I think your enterprise a little hazardous, you may rely on me, come what may."

"And equally on me," said James Wall.

"And as for you, Doctor, all I can say is, I know your worth."

"Well, that is more than I know," replied the little man, smiling.

"But now, gentlemen," resumed Hatteras, "it is well that you should know on what indisputable facts I base my expectation of reaching the pole. In 1817, the *Neptune*, of Aberdeen, went north from Spitzbergen, as far as the 82nd degree. In 1826, the celebrated Parry, after his third voyage in the Arctic Seas, went also north from Spitzbergen a hundred and fifty miles. In 1852, Captain Englefield sailed up Smith Sound as far as the 78th degree. All these vessels were English, and commanded by Englishmen, our fellow-countrymen."

Hatteras paused here, and went on in a sort of constrained voice, as if the words could hardly find utterance. "I ought to add that, in 1854, the American, Dr. Kane, in command of the brig *Advance*, got still higher; and that Morton, his lieutenant, crossed the ice-fields and hoisted the flag of the Union beyond the 82nd degree. Having said this, I shall not revert again to the subject. What I wish to tell you is this: the captains of all these vessels agree that, extending from these latitudes, there is a polar sea entirely free from ice."

"Free from ice!" exclaimed Shandon; "that's impossible."

The captain's eyes flashed for an instant, but he replied calmly: "You will please to notice, Shandon, that I am giving you facts and names—"

"But, captain," interrupted Shandon again, "the facts are so contradictory!"

"Wrong, Shandon, wrong," said Dr. Clawbonny; "Science goes to support these facts, not to disprove them, as I should like to show you, if the captain will allow me."

"Say on, Doctor," said Hatteras.

"Well, Shandon, listen, then. It is clear, from geographical facts and from the study of the isothermal lines, that the coldest point of the globe is not at the pole, but several degrees from it. Hence Brewster and Bergham, and others conclude that there are two points of greatest cold, one in Asia, in 79° 30' of north latitude and 120° of east longitude; the other in America, in 78° of north latitude and 97° of west longitude. It is this latter which concerns us; and, you see, Shandon, it is situated about 12° below the pole. Now, then, I ask you, why should not the sea at the pole be as free from ice as it is in the summer in the 66th parallel, that is to say, to the south of Baffin Bay?"

"Mere chimeras and suppositions! Sheer conjecture!" replied Shandon, obstinately.

"Well, Shandon, let us consider the case both ways. Either there is a clear, open sea, or there is not. If there is, the *Forward* will sail along without difficulty; if it is all frozen over we shall use our sledges, and so whichever it may turn out, there is nothing to hinder us gaining the pole. You will allow it is not impracticable; when once the brig gets as far as 83°, we have only four hundred and twenty miles farther to go."

"And what is that!" exclaimed the enthusiastic Doctor, "when we know that a Cossack, Alexis Markoff,

traveled along the northern coast of the Russian Empire over the Frozen Sea, in sledges drawn by dogs, a distance of eight hundred miles, in twenty-four days?"

"You hear that, Shandon?" returned Hatteras; "and now tell me if Englishmen cannot do as much as the Cossacks?"

"I should think so!" exclaimed Johnson and the Doctor; but Shandon made no reply till Hatteras said: "Come, Shandon, tell me."

Then he merely said in a freezing tone.

"Captain, I can only repeat what I have already told you—I will obey."

"Well," continued Hatteras, "let us look now at our actual situation. We are caught amidst the ice, and it seems to me impossible to get into Smith Sound this year. This is what we had better do, then."

He unfolded a map and spread it out on the table, and tracing the route with his finger, said:

"Please to follow me. Although Smith Sound is closed against us, Lancaster Sound on the west side of Baffin Bay is not. My opinion is, that we should enter this and go up as far as Barrow Strait, and from thence on to Beechey Isle. Sailing vessels have taken this course a hundred times, and certainly with our screw it should not be more difficult, at any rate. Once at Beechey Isle, we will get as far north as possible up Wellington Channel, and come out just at the very point from which the open water was visible. This is only the 20th of May; under favorable circumstances we shall be there in a month, and make it our starting point for the pole. What is your opinion, gentlemen?"

"It is clearly our only course," said Johnson.

"Well, we shall adopt it then, and start to-morrow. Let us make this Sunday a day of rest, and be sure that you attend, Shandon, to the regular reading of the Scriptures with the men. These religious observances have a most salutary effect on the human spirit, and a sailor, especially, needs to put his trust in God."

"I will see to it," replied Shandon, as he went away with Johnson and Wall.

"Doctor," said the captain, when they were left alone, "that man, Shandon, can't get over his mortification! He is eaten up with pride; I can no longer depend on him."

NEXT morning the boat was lowered, and Hatteras went round in it to examine all the icebergs in the basin. He noticed during his survey that its dimensions were constantly narrowing, owing to the slow, steady pressure of moving ice, and that consequently the brig would inevitably be crushed before long, unless an immediate breach was made. The energy of the man was shown by the plan he adopted.

His first business was to have steps cut in one of the icebergs, and climb to the top of it. From this elevation he saw there would not be much difficulty in clearing a passage to the south-west. He ordered a mine to be dug almost to the heart of the mountain, and in the chamber of this he deposited 1,000 lbs. of gunpowder. The blasting cylinders were only adapted

for breaking ice-fields; they would have been useless against the towering masses by which the brig was encircled. A gutta-percha tube containing a fuse was carried from the chamber to the outside, and the passage communicating was filled up with snow and blocks of ice, which the ensuing night, combined with the action of the east wind, would make it all as solid as granite.

All this preparation was Monday's work, and next morning by seven o'clock the *Forward* was under steam, ready to seize the first opening to make her exit. Johnson was entrusted with the lighting of the fuse, which was reckoned to burn for half an hour before coming in contact with the powder. This was ample time to ensure his safe return to the vessel. In fact, he was back in ten minutes.

The crew were all on deck, and the weather was fine and tolerably clear, for the snow had ceased to fall. Hatteras stood on the poop with Shandon and the Doctor, counting the minutes by his chronometer.

At thirty-five minutes to eight a dull explosion was heard, far less astounding than might have been expected. The outline of the mountains suddenly changed as in an earthquake, a thick white smoke rose towards the sky, and long crevasses striped the side of the iceberg, the summit of which seemed hurled from a distance, and fell in shattered fragments round the *Forward*.

But the pass was not yet open. Enormous blocks of ice remained suspended in the air, propped up by the adjacent mountains, and their fall would only block up the basin still further.

Hatteras took in the situation at a glance, and calling to the gunner, desired him to triple load the cannon.

"What! are we going to attack the mountain with cannon-balls?" asked the Doctor.

"Not exactly," said Hatteras, "that would be useless. No ball, Wolsten, but only a triple charge of powder. Be quick!"

All was ready in a few minutes.

"What will he do without ball?" muttered Shandon.

"We'll see," said the Doctor.

But the brig was too far from the iceberg, and Hatteras ordered the engineer to put the screw in action. A few turns were sufficient, and the command was given—Fire! A considerable explosion followed, which caused such an atmospheric commotion that the blocks were suddenly precipitated into the sea.

"Put on all steam possible, Brunton!" shouted the captain; "and get right out, Johnson, into the pass?"

Johnson seized the helm, the *Forward* dashed through the foaming waves, and next minute was free. It was a sharp run for her, and she had scarcely cleared the opening before the prison closed again behind her.

It was a moment of intense excitement, and there was but one heart on board that beat quietly. This was the captain's, and the crew, unable to restrain their feelings of admiration for him, burst out into cheers, and shouted, "Hurrah for John Hatteras!"

On Wednesday, the 23rd of May, the *Forward* resumed her adventurous navigation, skillfully changing

her course, so as to keep clear of packs and bergs, thanks to her steam, that obedient power that has been so often wanting in Arctic ships.

The temperature was rising. At 6 A. M. the thermometer stood at 26 degrees, at 6 P. M. at 29, and at midnight 25. A light breeze was blowing from the south-east.

About three o'clock on Thursday morning the *Forward* came in sight of Possession Bay, on the coast of America, and soon afterwards caught a glimpse of Cape Burney. Several Esquimaux were making hard for the ship, but Hatteras had no time to waste waiting for them. The puffins, and ducks, and white gulls were very numerous; and in the distance the snowy hoods of the Catherine and Elizabeth mountains were visible above the clouds.

On Friday, at six o'clock, Cape Warendor was passed on the right, and Admiralty Inlet on the left. There was a strong sea, and heavy waves frequently dashed over the bridge.

Hatteras would have liked to keep along the northern coast for the sake of reaching Beechey Isle sooner, but an impenetrable barrier of ice barred his further progress in that direction, and he was, to his great vexation, forced to go by the south.

This was the reason why the *Forward* found herself on the 26th at Cape York, easily recognized by a lofty and almost perpendicular mountain which overlooks it. The latitude was found on observation to be 74° 4", and the longitude 84° 23".

Hatteras opened the map, and pointed out to the Doctor the routes they had been taking and meant to take.

"We are in cross roads, I may call it," he said, "open to the wind on all sides. Here is Lancaster Sound, Regent Inlet, Wellington Channel, and Barrow Strait."

"It is a wonder to me how navigators know which route to take, when they have all four to choose from."

"Believe me there is little choice in the matter. Sometimes Barrow Strait is closed one year and open the next, and sometimes there is no passage at all but through Regent Inlet."

"How the wind blows!" said the Doctor, drawing his hood closer over his head.

"Yes, the north wind especially; it is so strong as to drive us out of our course."

"Well, but if it does that, it surely ought to drive the ice south, and clear the way."

"It ought, but the wind doesn't always do what it ought. Look at that ice-field ahead; it looks perfectly impenetrable, and yet we must try to find some opening, for get to Beechey Isle I must at any rate, to replenish our stock of coal."

"Can you get coal there?" asked the Doctor, in astonishment.

"Most certainly. By order of the Admiralty, great stores were deposited there for the benefit of future expeditions; and though McClintock may have availed himself of them in 1859, there will be some left for us, I assure you."

"The Admiralty always kept five or six ships out

here, I believe, till it was proved beyond a doubt that the whole of Franklin's ill-fated expedition had perished."

"Yes, they did. For fifteen years these regions were being explored, and one good result has followed anyway—our knowledge of the polar seas has greatly increased."

"It could hardly be otherwise, seeing the number of expeditions since 1848, when the first alarm was raised about the missing ships. Since McClintock returned in the *Fox*, however, not another vessel has ventured to try her fortune in those dangerous seas."

"Well, we'll try ours," said Hatteras, "come what may."

CHAPTER XIV

The "Forward" Driven South

THE weather cleared towards evening, and the shore became visible between Cape Sepping and Cape Clarence. The sea was open towards Regent Inlet, but as if the Fates had conspired against the *Forward's* progress north, there was still an impassable barrier of ice, which shut them out from Port Leopold.

Hatteras, who was extremely annoyed, though he did not show it outwardly in the least degree, had to fall back on his powder again to force an entrance, but he succeeded in getting in by mid-day on Sunday, the 27th of May, and safely moored his brig to great icebergs hard and solid as rocks.

A few minutes afterwards he jumped down on the ice and went ashore, followed by the Doctor and Johnson, and the faithful Duk, who was almost frantic with joy at being on land again. He had grown much more sociable and gentle since his master was acknowledged captain, reserving his animosity for certain members of the crew, who were no greater favorites with him than they were with Hatteras.

The port inside was unusually free from ice, and the steep perpendicular cliffs were gracefully wreathed with snow. The house and beacon constructed by James Ross were still in a tolerable state of preservation, but the provisions had been ransacked by the foxes and bears, and showed marks of recent visits from them. Likely enough, two-footed marauders had been there too, for ruins of Esquimaux huts were visible about the bay.

The six graves, marked by little hillocks, where six of the crews of the *Enterprise* and *Investigator* lay buried, remained intact, respected alike by man and beast.

It is impossible to set foot for the first time on Arctic ground without a feeling of peculiar emotion, as one relic and another is discovered, and the excitable little Doctor was almost overcome.

"Look!" he said to his companions; "there is the house that James Ross called 'The Camp of Refuge!' If Franklin's Expedition had reached this spot it would have been saved. There is the very engine Ross left behind, too, and the stove where the crew of the *Albert* warmed themselves in 1851, looking just as if Kennedy,

the captain, had only quitted the place yesterday! And there is the boat that sheltered him and his party for several days when they got separated from the ship, and must have perished but for Lieutenant Bellott, who set out to seek them, even though it was October."

"I knew Bellott," said Johnson, "and a brave, noble officer he was."

While the Doctor was pursuing his investigations with all the enthusiasm of an antiquary, Hatteras was busily exploring in all directions for food and fuel, though he met with small success. The next day was employed in carrying what he had found to the ship. The Doctor meantime continued his rambles, taking care not to get too far away. He sketched a good many of the principal objects of interest, and managed to make a pretty fair collection of the different varieties of Arctic birds. He also saw several large seals, lying by their breathing-hole on the ice, but could not shoot any of them. During one of his excursions, he discovered a large stone with this inscription on it:

(E. I.)

1849.

These were the initials of the *Enterprise* and *Investigator*, a memento left behind of their voyage. He went on as far as Cape Clarence, where John and James Ross waited, in 1833, so impatiently, for the breaking up of the ice. The ground was strewn over with bones and the skulls of animals, and traces were seen of Esquimaux huts.

The Doctor was thinking of setting up a cairn at Port Leopold, with a written statement in it of the arrival of the *Forward*, and the object of the expedition, but Hatteras was so decidedly opposed to leaving any indications whatever of their progress, lest some rival should take advantage of them, that the Doctor had to abandon his project. Shandon greatly blamed the captain's infatuation, as, in the event of any misfortune happening to the *Forward*, no vessel could go to her rescue.

But Hatteras would listen to no reason, and the moment loading was completed, he recommenced his efforts to break through the ice. After many dangerous attempts, however, he was forced to give it up, and go back the way he came, through Regent Inlet, for he would not winter in Port Leopold for anything. It was open meantime, certainly, but a sudden dislodgment of the ice-fields might close them in at any moment.

Hatteras was almost distracted with anxiety, though there was no outward manifestation of it. He had no alternative but to turn his ship and go south, come what might.

Regent Channel is about the same width the whole extent from Port Leopold to Adelaide Bay. The *Forward* was more fortunate than most ships, for she made an uninterrupted passage through, thanks to her steam, instead of beating about for a month or more, often driven back by contrary winds.

Most of the crew were well content to turn their backs on the north. They had no sympathy with the captain's project of reaching the pole—indeed, they were almost terrified at him, dreading what next he

might attempt, for they knew how little he cared for consequences.

IT was evening when the brig came in sight of Edwin Bay, easily recognized by its high perpendicular rocks; and the next morning she saw Batty Bay in the distance, where the *Prince Albert* spent her long dreary winter.

The Doctor and Johnson, perhaps, were the only individuals on board who took any interest in the country. Hatteras was always poring over his charts, and hardly spoke a word. The farther south they went, the more taciturn he became, often sitting on the poop for hours together, with folded arms, gazing gloomily on the horizon. He gave his orders in the fewest words possible and in sharp, stern tones. Shandon kept himself aloof as much as he could, and gradually withdrew from all intercourse with Hatteras beyond what actual business required. James Wall was still devoted to Shandon, and faithfully copied his example. The rest of the crew were watching the course of events, ready to take the side that would be best for their own interests. There was no longer on the ship that unity of purpose and interchange of sentiment which is so necessary for the accomplishment of great things. Hatteras knew this well.

Two whales were seen during the day, and a white bear, but time was too precious to waste in pursuit of that kind, though a few ineffectual shots were fired.

On Wednesday morning the extremity of the inlet was reached, and the brig pursued her course, keeping along the west coast round a point, which, on referring to the chart, the Doctor found was Somerset House, or Fury Point.

"This, then," he said to Johnson, "is the very point where the *Fury* was so broken by the ice in 1815 that she had to be abandoned, and her crew went on board her consort, the *Hecla*, and returned home to England."

"That is the advantage of having a second ship, you see," replied Johnson; "but Captain Hatteras is not the man to be fettered with a companion!"

"Do you think that it is imprudent of him, Johnson?" asked Clawbonny.

"I? I think nothing about it, Dr. Clawbonny. Stop! Do you see those stakes on the shore, with tattered rags hanging on them, as if a tent had once been there?"

"Yes, Johnson; it was there that Parry disembarked his ship's stores; and, if my memory is correct, the roof of the house he built was made of a topsail, laced over with the running rigging of the *Fury*."

"But that was in 1825. It must be very much changed since then."

"Not altogether though, Johnson. In 1829, John Ross found in that little frail hut, life and health for his crew. In 1851, when Prince Albert sent out an expedition, it was still standing. Captain Kennedy had it repaired, and that was nine years ago. It would be an interesting memorial to go ashore and examine, but Hatteras is not in the mood to stop!"

"And there is no doubt he is right, Dr. Clawbonny. If time is money in England, out here it is salvation;

and to stop a day—ay, even an hour—might ruin a voyage. Let him act as he thinks right."

On Thursday, the 1st of June, the weather became milder, the thermometer rising to thirty-two degrees. Summer made its influence felt even in those Arctic regions, and the men were glad to lay aside some of their winter coverings.

Towards evening, the *Forward* doubled Cape Garry, about a quarter of a mile from shore, and went on to Brentford Bay, keeping as close to the coast as possible, for the fog had increased with the heat, and a close watch was necessary for the discovery of Bellot Strait. It was somewhere in this latitude, but, if closed by ice, so perfectly undistinguishable from the land, that Sir John Ross never suspected its existence even in 1828, and, though he noted down and named the smallest irregularities with the greatest care on his charts, he made this one continuous coast.

It was Captain Kennedy who really discovered the Straits in 1852, and called them after the French officer, as a just tribute of gratitude for the important services he had rendered the expedition.

CAPTER XV The Magnetic Pole

THE nearer Hatteras approached the Strait, the more his anxiety increased. He felt the fate of his voyage was about to be decided, for though he had outstripped all his predecessors up to this time, as even McClintock, the most fortunate of them, had taken fifteen months to reach the same place, it mattered little, indeed nothing, if he could not succeed in getting through Bellot Strait.

He would trust the look-out to no one, but went up to the "crow's-nest" himself, and stayed there the greater part of Saturday morning.

The crew understood perfectly their critical position, and preserved an unbroken silence. The engine had slackened speed, and the brig kept to the shore as closely as possible; but it needed a practiced eye to discover the least opening among those close packs.

Hatteras was comparing his charts and the coast. The sun broke out for a brief instant before noon, and Shandon and Wall managed to take a pretty correct observation, which they reported aloud to Hatteras.

It was a trying morning for all; but at last, about two o'clock, a cry resounded from the mast-head:

"To the west, and put on steam!"

The brig instantly obeyed. She turned her prow in the given direction, and rushed forward between two ice-streams.

The entrance was found, and Hatteras gave up his post to the ice-master, and came down on the poop.

"Well, captain," said the Doctor, "we have actually entered this famous strait at last."

"Yes," replied Hatteras, lowering his voice, "but it is not enough to enter. We have to get out again."

Without another word he turned, and walked off to his cabin.

"He is right," said the Doctor, "for we are in a

mouse-trap, without much room to do anything; and if we are blocked in for the winter, well, we are not the first that have got into this same fix. The others got out, so I suppose we shall, too!"

The Doctor was right. It was in that very place that McClintock wintered in 1858, and the little dock was then in sight. He found shelter there and called it Port Kennedy.

Bellot Strait is about a mile wide and seventeen long, with a current running from six to seven knots. It is encased in mountains calculated at 1,600 feet high. The *Forward* had to proceed cautiously, but still she made progress. Storms are frequent in such a narrow space, and the brig did not escape heavy seas and strong squalls of wind. In spite of every precaution taken by the captain in reefing and taking in sails, it was an enormous strain on the ship. It was impossible almost to stand on deck, and most of the men studied their own comfort, and went off, leaving Hatteras with Shandon and Johnson. The little Doctor did not feel any more inclination than the sailors to brave the snow and rain, but, acting on his old rule, always to do that which is most disagreeable to him, he went up to bear the others company; and since he could not hear himself speak, and even barely see himself, he was obliged to keep his reflections for his own benefit.

He found Hatteras trying to pierce through the curtain of fog before him, for, according to his reckoning, they ought to have come to the end of the strait by six o'clock; but no outlet was visible, and the only thing that could be done was to anchor the ship fast to an iceberg, and wait till morning.

It was fearful weather; every instant it seemed as if the *Forward* would snap her chains, and there was great danger of the iceberg itself giving way beneath the violence of the west wind, and drifting along, ship and all. The officers were on the *qui vive* the whole night, and felt the gravest apprehensions. There was not only a perfect blizzard of snow, but showers of hail were lashed up by the hurricane from the ice-fields; the whole atmosphere was, as it were, bristling with sharp arrows.

Strangely enough, there was a great rise in the temperature during this fearful night. The thermometer stood at 57°, and the Doctor, to his great surprise, thought he saw several flashes of lightning in the south, followed by very distant thunder.

About five in the morning, the weather changed again with astonishing rapidity, and the thermometer fell to freezing point. The wind veered north, and became calm. The western opening of the strait was now visible enough, but it looked entirely blocked up. Hatteras almost doubted whether it had ever been the opening.

However, the brig got under way again, and glided slowly along between the ice-streams, crushing the edges of the packs against her side planking. The packs were still six to eight feet thick, and the utmost care was necessary to avoid coming into collision with any of them.

At noon, and for the first time, a magnificent solar phenomenon was observed, a halo with two parhelia.

The Doctor took the exact dimensions: the outer corona was only visible for about 30° on each side of the horizontal diameter. The two images of the sun were remarkably distinct. The colors of both the arches were red nearest the sun, and then yellow, green, and very pale blue, fading into white outside.

Old sailors in the Arctic seas generally consider this phenomenon the presage of a heavy snowfall. Should their opinion prove correct, it would place the *Forward* in a still more awkward position. Hatteras felt that everything depended on getting forward without delay. He spent the remainder of the day and the whole of the night following on deck, without allowing himself a moment's rest, seeking for some practicable lead.

But next morning, when the Doctor joined him on the poop, he beckoned him right away to the after part of the ship, where they were quite out of ear-shot, and said:

"We are caught! It is impossible to get any farther."

"Impossible?" asked the Doctor.

"Yes, impossible! All the powder in the *Forward* would not gain a quarter of a mile for us."

"What's to be done, then?"

"Who knows? Confound this weather. It is an ill-omened year."

"Well, captain, if we must winter here, we must—that's all! As well here as anywhere else."

"True enough!" said Hatteras, in a low voice; "but we must not winter, especially in the month of June. Wintering at all is full of moral and physical danger. A crew soon becomes enervated by inactivity, combined with positive suffering, and I had made up my mind not to winter till we were in a much more northerly latitude."

"But Fate decreed that Baffin Bay should be closed."

"Ay! and it could open for others—for that American!" exclaimed Hatteras, angrily.

"Come, Hatteras," said the Doctor; "this is only the 5th of June. Don't let us despair. A sudden opening may occur. You know the tendency of the ice to separate, even in calm weather. Perhaps in less than an hour there may be a free outlet."

"I wish it may be so. We would soon get through it, and once outside this strait, we may be able to go north again by Peel Strait, or the McClintock Channel. Then we——"

"Captain," said James Wall, interrupting him suddenly, "our rudder runs the risk of being torn away by the packs."

"Well, it must take its chance; I cannot have it removed. I wish to be ready at any hour, both day and night. See that it is protected as much as possible, Mr. Wall, by avoiding coming into contact with the ice; but let it remain in its place, remember."

"But——" said Wall.

"I wish for no remarks, sir!" said Hatteras, sternly. "Go."

WALL returned to his post, and Hatteras exclaimed passionately:

"Oh! I would give five years of my life to find my—"

self at the north. I know no passage that is more dangerous than this, and to increase the difficulty, now that we are getting near the magnetic pole, the compass there is not acting properly, the needle seems getting lazy or foolish, for it is constantly shifting its direction."

"I must confess it is perilous navigation now; but, after all, everyone who joined the expedition knew the dangers he had to expect, so he needn't be surprised."

"Ah, Doctor, my crew are very much changed, and, as you have just heard, the officers begin to set up their opinion. The pecuniary advantages offered to the sailors made them engage in the service; but the worst of it is, when men join like that, all they care for is to get home again, and be paid as quickly as possible. Then, too, I am not seconded by my officers as I ought to be, Doctor. If I fail in my undertaking, it will not be the fault of such and such a sailor, but through the ill-will of certain officers. Ah, won't I make them pay dearly for it!"

"Hatteras, you are exaggerating."

"I am not exaggerating in the least. Do you believe the sailors are sorry we cannot get north? On the contrary, they rejoice in my difficulties, thinking I shall be forced to relinquish my project. That is the secret of our hearing no grumbling just now. As long as the *Forward* has her beak headed to the south, they are all ready enough to work. The fools! They fancy they are always nearer England! But if I succeed in getting north, you will see things change. However, I swear that not a single human being will make me go out of my track. Let me only find the smallest opening to get my brig through, and in she'll go, even if she has to leave her copper bottom behind her."

The captain was destined to get his wishes partially realized, for in the course of the evening, as the Doctor had said, there was a sudden change. The ice-fields cracked and opened, and the *Forward* boldly dashed in between them, crushing the loose ice with her metal stem. She went without stopping all night, and next morning, about six o'clock, got outside the strait.

But what was the captain's secret vexation to find the way to the north still obstinately shut against him. He had sufficient self-command to conceal his despair, and as if the only route open had been the very one he preferred, he sailed down Franklin Strait; not being able to get north by Peel Strait, he determined to go round the point and up the McClintock Channel. But he felt that Shandon and Wall were not deceived; they well understood his bitter disappointment.

For thirty-six hours the *Forward* followed the windings of the Coast of Boothia, without getting near Prince of Wales Island. Hatteras raised the steam, burning away the coals in prodigal fashion, always hoping to replenish the store at Beechey Island. On Thursday he reached the extremity of Franklin Strait, and again found the route to the north barred against him.

His situation was hopeless now. He could not even go back, for the heavy packs were pushing him continually forward, and what had been open water but an hour before, was now solid ice.

It was a terrible predicament for the *Forward*, for she could not get north, and yet dared not stop for fear of a crush.

All that she could do was to flee as if it were before a storm.

On Friday, the 8th of June, he arrived at the mouth of James Ross Strait, one which he must avoid at any cost, for it had no outlet except to the west, right on the American coast. The longitude here was found to be $90^{\circ} 46' 45''$, and the latitude $70^{\circ} 5' 17''$. On referring to the map, the Doctor discovered they had reached the magnetic pole, for this was the very part where it had been discovered by James Ross.

The shore near the coast was flat, rising in the background a mile from the sea to a height of about sixty feet.

Finding that the boiler needed to be cleaned, the captain anchored his brig to the ice, and allowed the Doctor and Johnson to go ashore. As for himself, he felt no interest in anything that was not immediately connected with his projects, and only cared to shut himself up in his cabin and pore over his charts.

The Doctor and his companion were soon on land, carrying a compass with them for their experiments. The Doctor wished to test for himself the accuracy of James Ross's observations. He easily discerned the heap of chalk stones he had set up, and on hastening towards it, perceived through an opening the identical tin case in which he had deposited a minute account of his discovery. Not a single human being seemed to have visited this dreary coast for thirty long years!

If a magnetized needle is suspended here as delicately as possible, it will immediately assume an almost vertical position under the magnetic influence. The center of attraction then, if not exactly below the needle, must be but a very short distance off.

The Doctor made his experiments with the utmost care, and was more successful than even James Ross, who could never get a higher declination for his vertical needle than $89^{\circ} 59'$, owing to the imperfection of his instruments, while Dr. Clawbonny had the extreme satisfaction of seeing his needle indicate a declination of exactly 90° .

"This, then," he said, tapping the ground with his foot, "is the actual magnetic pole of our globe."

"Is it just here?" asked Johnson.

"In this precise spot."

"I suppose then it is all nonsense to talk about a magnetic mountain, or a mass of lodestone!"

"Yes, my good fellow, it is all 'old wives' fables.' As you see for yourself, there is not a sign of a mountain endowed with the power of attracting ships, and tearing away their iron, down to anchors and nails. Even your boots do not feel any heavier, as if they were dragging you down, do they? You can walk as easily here as anywhere else."

"But how can it be explained?"

"It can't be explained. We are not learned enough for that yet. But this one thing is an ascertained mathematical fact—the magnetic pole is here, in this very place."

"Ah! Dr. Clawbonny, what would the captain give if he could say as much of the north pole?"

"He will say it some day, Johnson, that he will."

"I fervently hope he may."

Just at this moment the signal was made for their return, and after hastily erecting a cairn to mark the exact spot, they hurried back to the brig.

CHAPTER XVI

The Story of Sir John Franklin

THE *Forward* succeeded in cutting right across the James Ross Strait, but it was only done by dint of saws and petards, and at the cost of great fatigue of the crew. Fortunately the temperature was bearable; 30° higher than James Ross had found it at the same time of the year. The thermometer stood at 34°.

On Saturday, Cape Felix was doubled, at the extreme point of King William's Island. The sight of this island made a deep impression on the minds of the men, and they gazed with mournful interest at the coast as they sailed along. This was the theater of one of the most terrible tragedies the world has ever seen, for, only a few miles to the west, the *Erebus* and *Terror* were lost.

Johnson and the Doctor were going over the particulars of the sad catastrophe as the vessel fled swiftly on, and bays and promontories passed before the eye like same vast panorama. Several of the sailors, overhearing the subject of conversation, drew nearer to listen, and before long the Doctor had the whole crew round him. Seeing their eager curiosity, and knowing what an impression the recital would make under such circumstances, the Doctor recommenced his narrative.

"You know, I suppose, my good fellows," he said, "the early history of Franklin. He was a cabin-boy, like Cook and Nelson, and, after serving during his youth in several great expeditions, he determined, in 1845, to prosecute a search for the North-West passage. He was in command of the *Erebus* and *Terror*, two ships that had been previously employed in an Arctic expedition undertaken by James Ross. The *Erebus* carried seventy sailors, including the officers, with Fitz-James as captain; Gore and Vesconte as lieutenants; Des Vœux, Sargent and Couch as quartermasters; and Stanley as surgeon. The *Terror* numbered sixty-eight men. Her captain was Crozier; the lieutenants, Little, Hodgson, and Irving; quartermasters, Horesby and Thomas; and surgeon, Peddie. Not one of these ill-fated individuals ever returned to their native land, but you may read nearly all their names on the different bays, and capes, and straits, and points, and channels, and islands that are met with in this region. There were 138 men altogether. The last letters received from Franklin were dated July 12th, 1845, and written from Disko Island. 'I hope,' he wrote, 'to weigh anchor to-night for Lancaster Sound.' What has happened since his departure from Disko? The last time the ships were seen was in Melville Bay, by the captains of the *Prince of Wales* and the *Enterprise*, two

whalers; and since then there has been no word of them. We are able to follow Franklin, however, in some of his subsequent movements. He went to the west, and up Barrow Strait and Lancaster Sound, as far as Beechey Island, where he spent the winter of 1845."

"But how was that ascertained?" asked Bell, the carpenter.

"By three graves discovered by the Austin expedition in 1850, in which three of Franklin's sailors were interred; and also by a document found by Lieutenant Hobson, of the *Fox*, which is dated 1848. From this we learn that, at the close of the winter, the *Erebus* and *Terror* went up Wellington Channel as far as the 77th parallel; but, instead of continuing their route to the north, which was doubtless found to be impracticable, they returned south."

"And it was their ruin," said a grave voice. "Salvation was in the north."

Everyone turned to see who was the speaker. It was Hatteras, leaning against the railing of the poop, who made his home-thrust at the crew.

"There is no doubt," continued the Doctor, "that Franklin's intention was to reach the American coast; but he was overtaken by furious tempests, and both ships got caught in the ice a few miles from this, and were dragged N.N.E. of Point Victory. But the ships were not abandoned till the 22nd of April, 1848. What happened during those nineteen months? What did the poor fellows do with themselves all that time? No doubt they explored the country, and tried their utmost to reach a place of safety, for Franklin was a man of great energy, and if his measures were unsuccessful——"

"It was, perhaps, his crew who proved false to him?" again interrupted Hatteras, in a hollow voice.

No one dared to look up, for the cap fitted. The Doctor resumed his narrative, and said:

"The document I have mentioned gives the additional information of the death of Sir John Franklin. He sank under his fatigues on the 11th of June, 1847. Honor to his memory," he added, baring his head respectfully.

All the men silently followed his example. After a pause, Doctor Clawbonny went on to say:

"What became of the men after their admiral's death? Ten months elapsed before they forsook the ship, and the survivors then numbered one hundred and five men. Thirty-three were dead! A cairn was erected on Point Victory by order of the captains, Crozier and Fitz-James, and in it this, their last document was deposited. See, we are just passing the very place. You will see the remains of this cairn on the very extremity of the point. And there is Cape Jane Franklin, and there is Point Franklin, where they found the boat made out of pieces of one of the ships and laid on a sledge. They also discovered silver spoons there, and tea and chocolate, besides religious books and provisions in abundance. For the hundred and five survivors, under the guidance of Captain Crozier, set out for the great Fish River. How far did they get? Did they

reach Hudson Bay- Do any of them still survive? Who can say what has become of them all now.

"I can say what has become of them," replied John Hatteras, in loud, ringing tones. "Yes, they did reach Hudson Bay, and divided into several parties. They took the route south, and in 1850 a letter of Dr. Rae mentioned the fact that on this very island before us, the Esquimaux fell in with a detachment of forty men hunting seals over the ice, dragging a boat with them, and looking pale and haggard, worn out with suffering and fatigue. And subsequently thirty corpses were found on the mainland, and five on an adjacent isle, some half buried, and some lying quite exposed; others under a boat turned upside down, and others still under the remains of a tent; here an officer, with his telescope on his shoulder and his loaded gun beside him, and not far off cauldrons with the fragments of a ghastly sickening meal.

"On the receipt of this intelligence, the Admiralty requested the Hudson Bay Company to dispatch experienced men to search the entire region. They explored the whole of the Black River to its mouth. They visited the islands of Montreal, Manconochie, and Point Ogle. But it was all in vain. Every one of the hapless company was dead! Dead from starvation, and pain and misery, after making a horrible attempt to prolong their wretched lives by cannibalism! This is what has become of them. The route south is strewn with their mangled remains! ! Do you still desire to walk in their footsteps?"

The thrilling voice and impassioned gestures and earnest face of Hatteras produced an indescribable effect on the men, and, carried away by their emotion, they shouted with one accord:

"To the North! To the North!"

"To the North, then, we'll go, my men! Safety and glory lie there! Heaven is on our side; the wind has shifted! The channel is open, turn about the ship!"

The sailors rushed to their posts, the *Forward* was soon making at full speed for the McClintock Channel.

Hatteras was right, the ice had given way, and the ship found her passage almost unobstructed. On the 14th of June she had gone beyond Osborn Bay, and farther than any of the expeditions of 1851. The ice-packs were still numerous, but she never lacked water beneath her keel.

CHAPTER XVII

The Route to the North

THE crew had apparently returned to their good habits of discipline and obedience. Their work was not fatiguing now, and they had abundance of leisure. The temperature still remained above the freezing point.

Duk, who had grown quite friendly and sociable, struck up the closest friendship with Dr. Clawbonny. They were on the best possible terms, though it must be confessed Duk was quite master, and made the little Doctor do whatever he pleased. Towards the crew, too, and officers generally, Duk was amiable enough,

except towards Shandon, and from him he always ran away as fast as he could, doubtless impelled by some secret instinct. He also kept a sharp tooth for Pen and Warren; and what a tooth it was! He growled whenever they came near, though they never again attempted to lay a finger on him. No one dared to touch the captain's "familiar spirit," as Clifton called the dog.

On the whole, however, the confidence of the men seemed restored, and they were behaving well.

"It looks as if the crew had laid the captain's words to heart," remarked Wall to Shandon one day. "They don't appear now to have any misgivings about success."

"They are wrong," said Shandon; "if they were only to reflect and examine their situation, they would see we are going from one imprudent step to another."

"And yet," returned Wall, "the sea is certainly more open, and we are going on no untried route. Are you not exaggerating, Shandon?"

"No, Wall, I am not; the hatred or jealousy, if you choose to call it so, which I feel towards Hatteras, has not blinded my eyes. Tell me, have you been down to see how the coals stand?"

"No," replied Wall.

"Well, just you go, and you will see how fast our stock is diminishing. The rule with us should have been to rely on our sails mainly, reserving the screw for special occasions when the wind was contrary, or there were strong opposing currents; our combustibles ought to be husbanded with the most rigid economy, for who knows where we may be driven, or how long we may be frozen up in these seas? But Hatteras, in his frenzied ambition to push north and reach the inaccessible pole, never troubles himself about such small matters. Whether the wind is for or against us, he must have all the steam up, and if he goes on much longer in the same fashion, we stand a chance of finding ourselves in a pretty fix some day, and even in danger of our total loss."

"If what you say is true, Shandon, the case is serious," replied Wall.

"Yes, Wall, very serious; not merely for the engine, which would be utterly useless without coal, just perhaps when we most needed it; but for ourselves, too, when we think of having to winter here, which we certainly must do, soon or late. One needs to think of cold a little in a country where the quicksilver even freezes in the thermometer."

"But, if I am not mistaken, Shandon, the captain is reckoning on replenishing his stock at Beechey Island. He can get an abundance of fuel there."

"Can people go just where they choose, Wall, in these seas? Can we ever reckon on finding the straits open? And supposing he should miss the island, or be unable to get to it, what will become of us?"

"You are right, Shandon. It is certainly imprudent of Captain Hatteras, but why don't you talk to him on the subject?"

"No, Wall," said Shandon, with ill-concealed bitterness, "I have made up my mind to be silent. I have
(Continued on page 171)

The GAS-WEED

By Stanton A. Coblentz

Author of: "The Sunken World"

IN all respects but one, there was nothing unprecedented about the ball of fire that startled the western hemisphere toward the end of the year 1968. A meteor of exceptional brilliancy, it was first observed somewhere far above the Arizona desert, traveling westward at a prodigious speed; and a few seconds later, after terrifying the natives of Southern California with its baleful red light, long phosphorescent trail and ominous hissing, it went to its rest on a forsaken beach of the Pacific. For ten or twelve days it was not even known where it had struck; observers generally were of the opinion that it had plunged into the ocean; and while newspapers bore a flaming account of the event and even the scientific journals took some note of it, astronomers were agreed that phenomena as spectacular had been observed before: as witness the records of innumerable fireballs, beginning with that declared by Plutarch to have fallen in Thrace as far back as the year 470 B. C.

Had it not been for a chance observation, the theory that the meteor had vanished beneath the waves might long have remained current. But it happened that Clifton Herrick, an aviator flying low over the coast in the Intercontinental War, noticed an enormous mound or crater of earth reminding him of the shell-hole made by an exploding projectile, except that it was incomparably vaster than any shell-hole he had ever seen. Though its depth was not more than a score of yards, it measured between a quarter and a third of a mile from rim to rim. Herrick's first theory was that it indicated some previously unexplained volcanic action; and this view was apparently confirmed by the seething heat that drove him away when he attempted to approach closely, and by the scorched and withered state of the once-abundant beach-grass surrounding the place. Military experts, however, when told of the discovery, were of opinion that it represented some nefarious device by the foe; and only after the cautious investigation by the War Department did the astonishing truth reveal itself. A scientist of the investigating party, attracted by scattered masses of iron of a telltale composition, proclaimed that the eruption incontestably was of meteoric origin: the largest meteorite ever seen to fall by man lay buried here on the sea-coast!

Even so, the announcement occasioned no great

flurry. The world at that moment was engaged so busily in the practice of war, that scientific observations of a non-military nature aroused but passing interest. Little did men dream of the transcendent importance of this particular bit of scientific news! Little did they suspect that it was to prove more momentous than any war that man had ever waged! There were none who foresaw the gruesome, unthinkable events that were to convulse the world within the next year or two; for there were none who, at that day, could have known of the one respect in which that meteorite was different from all its predecessors, and of the tragic significance of the single point of variance.

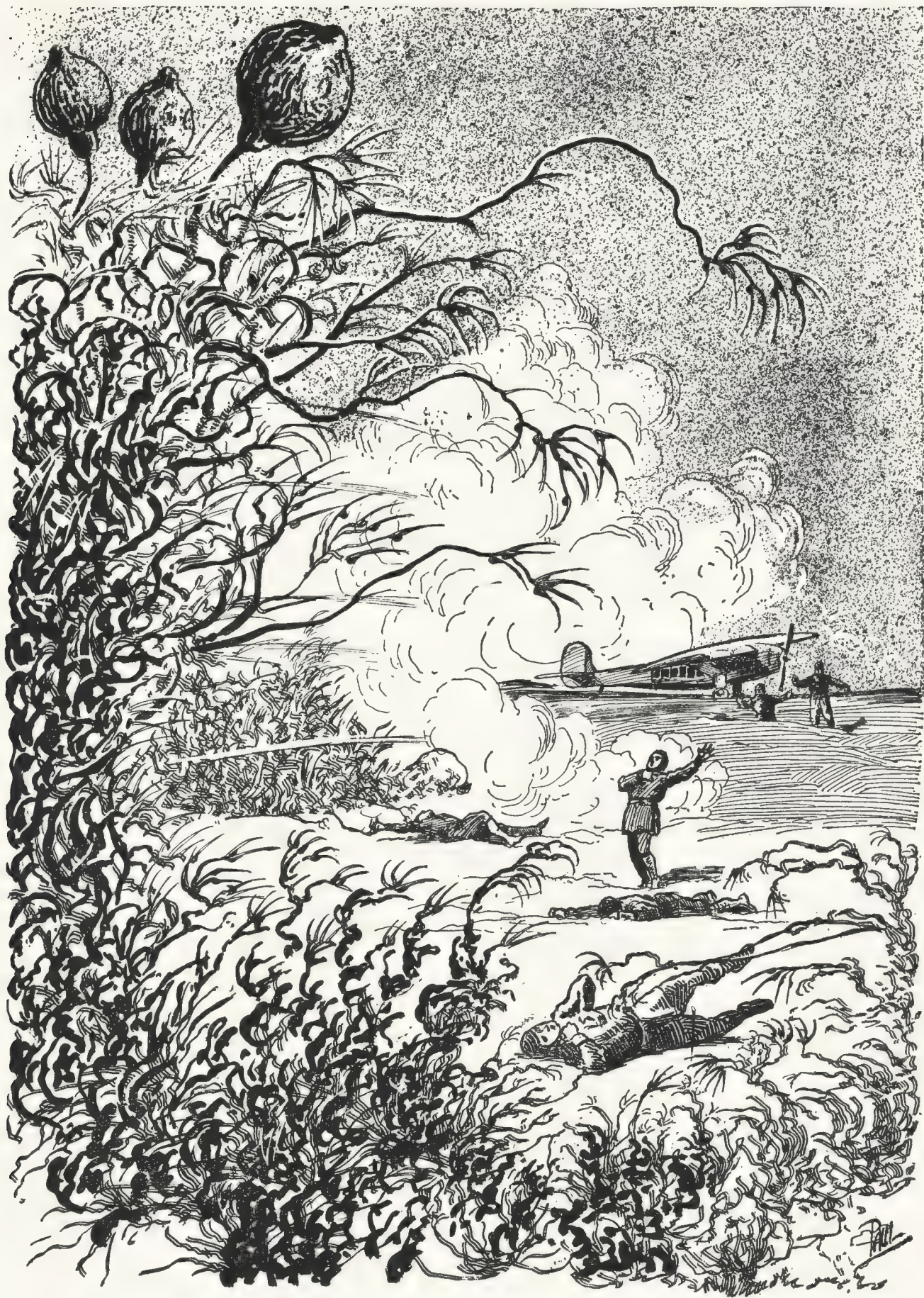
Ignorant of the peril that they were releasing upon their fellows, a small group of scientists began a minute investigation of the meteorite. As soon as it had cooled sufficiently to permit them to work in comfort, they undertook their excavations, burrowing on all sides and even beneath the enormous mass, and at the same time blowing off some huge fragments by means of dynamite. These they subjected to chemical analysis, finding them to be composed of the same alloy of iron and nickel as that of countless smaller meteorites. It was only after they had penetrated deep down into the fallen mass that they discovered anything of scientific note; and then the observations, while unusual, did not seem in any way significant. At a depth of about forty feet, the dynamite of the excavators revealed a rich vein of some quartz-like rock—not precisely like any terrestrial quartz in appearance, yet of a flinty hardness and of the same chemical composition as quartz.

What was more important—but what the observers, in their haste, did not note until later—was that thousands of minute, black specks were embedded in the quartz, no larger than pinpoints and presenting under the microscope a smooth polished surface

It is not always an army or warfare of the most destructive kind that is most dangerous. The author of "The Sunken World," has conceived an entirely new menace—which is nothing less than a vegetable visitor from outer space. There are divers ways in which such a visitor might come to the earth—not the least possible means being a meteorite. It is a strange menace and almost impossible to combat.

Aside from its literary interest, this story is unusually rich in its scientific aspects.

and a shape not unlike that of the common bean. Had any of the scientists at that time taken notice of the black particles, he would probably not have been impressed, for they would have seemed to him to be mineral matter of no extraordinary nature; and no steps, accordingly, would have been taken to prevent them from escaping in their myriads into the world at large. And this is profoundly regrettable, for it means that, once the dynamite had released the unsuspected peril, no human agency would be able to check it at its source, or prevent its spreading.



For, after they had alighted from their airplane and started on foot for the plants, they encountered an unexpected obstacle. Then suddenly an extraordinary thing happened . . . the foremost of the scientists reeled, gasped, and sank with a deep sigh to the earth.

WEEKS went by. The world, unaffected, hastened fiercely about its other affairs. The Intercontinental War was blazing more hotly than any other conflict in history; the great trans-Pacific invasion was being undertaken, with the loss of a hundred million lives in India and China; airplanes were laying waste the leading cities of the Pacific seaboard, and poison gas was annihilating whole populaces in Australia and western Europe; and mankind, with one half of the white race and one half of the yellow race ranged against the other half of the white race and the other half of the yellow, was waging a desperate and apparently losing battle for existence. Had any one suggested that, while the guns were flaming and the shrapnel bursting, the most powerful arbiters of all lay strewn about a Pacific beach in the shape of some microscopic black particles, the idea would certainly have met with wholesale ridicule; yet the simple truth, which we of to-day realize all too bitterly, is, that each of those black specks contained more diabolical potentiality than a thousand tons of high explosive.

It was little more than a month before the first portents of disaster appeared. A party of chemists and astronomers, returning by airplane to conduct a fresh investigation of the meteorite—which had lain unheeded for several weeks—were startled to observe the altered appearance of the beach where it had fallen. All of them were sober men of science, yet all, as they afterwards confessed, rubbed their eyes and gaped and wondered if they were dreaming—it seemed almost as if the beach had disappeared! Or, rather, the sands of the beach had disappeared; and, at the same time, the crater caused by the meteor had almost vanished! But for hundreds of yards where the sands had been, and for other hundreds where the crater had gaped like a ghastly sore, there was a thick reddish growth of some mysterious vegetation! Weirdly translucent, and dense as the foliage of a tropical jungle, it fringed the ocean to a height of twenty feet, and, unaffected by the brine, stretched out into the water for well over a quarter of a mile!

It would be pointless to describe this strange vegetation in detail, for it has since grown familiar as grass to every child. Let it suffice to state that it was then in a half-developed, sprouting stage, somewhat like a leguminous plant with the cotyledons* still clinging to it. But even so, it presented an appearance sufficiently fantastic and imposing. It can be most nearly likened to a gigantic fungus, since it possessed no leaves at all; it consisted merely of a mass of tendrils, weaving and interweaving like a pile of intertangled cotton yarn; and its feelers, sprouting out in all directions as thickly as bristles from a brush, showed a tendency to curl like a corkscrew, and in many cases ended in claw-like protuberances that have been compared to the talons of eagles.

But as if these points of novelty were not sufficient, the plants showed other and still more striking peculiarities. The first of these was that, here and there

among the wilderness of tendrils, there was an opaque round mass double the size of a man's head, deep-purple in color, and surmounted by a growth of shoots and stems that bore a remarkable similarity to hair. And, to complete the likeness to a human head, there were several orifices corresponding remotely to mouth and eyes; and these were seen to open and contract for no known reason, giving the illusion of a face grimacing with the most horrible, distorted malevolence and mockery. Scientists were afterwards to explain that these were mere centers of growth, corresponding roughly to the trunk of a tree; but there are thousands who, to this day, remain unconvinced, and contend that the supposed plants were really not plants at all, but represented some inexplicable cross between vegetable and animal life. . . .

SUBSEQUENT events developed numerous arguments to support this view. One of them was to be found in the second marked peculiarity of the plants. This was discovered—and in a most unfortunate way—by the members of the scientific party upon their investigation of the curious growth. For, after they had alighted from their airplane and started on foot toward the plants, they encountered an unexpected obstacle. When they were within a hundred yards of the fringe of vegetation, a queer odor came to their nostrils, vaguely sweet, pungent, indescribable and as distinctive as the odor of ether, and more subtly unpleasant than they could explain. They had no thought, however, of possible danger, and continued on their way until the foremost was within twenty yards of the plants. Then suddenly an extraordinary thing happened. A pale greenish-yellow cloud, of the color of chlorine gas shot toward them from the plants, as though forced out of nozzles under high pressure. Before they had had time to retreat, the gas was drifting all about them. And the foremost of the scientists reeled, gasped, and sank with a deep sigh to the earth.

Two of his comrades, a little to his rear, likewise gasped and staggered, then wilted like men who have been shot, and dropped to earth. The remaining five members of the party, not quite in the line of attack, coughed heavily and felt their heads dizzily swimming, but somehow remained on their feet. Stumbling like drunken sailors, they struggled forward to aid their companions—only to succumb to a new wave of the gas, which leapt forth in a vehement burst from the tendrils of the plants. And when the second wave had passed, seven silent forms lay strewn about the beach.

But in the form of the eighth victim, still prostrate upon the sand, there might have been observed some signs of life. One man, a little further than his fellows from the reddish growth, might have been seen to move his limbs in random, feeble gestures, somewhat like a beetle that has been trodden upon. Gradually, in the course of what may have been hours, his movements began to take on a little force and direction; and there came a time when, with a sick sensation in the head and the unsteadiness of one who walks a hurricane-swept deck, he precariously regained his feet, and by turns stumbled and crawled away from the plant toward the waiting airplane. . . .

*These are the so-called seed leaves, which are what we eat in the leguminous plants. If you see a bean seedling just pushing up its head you will see the two cotyledons, which have protected the tender leaflets on their way through the soil.

He it was who, in a condition halfway between life and death, appeared on the following day in the western offices of the War Department, stammering forth a story of some incredible new poison gas contrivance, which resembled a reddish plant and lured one on to destruction. Such were his ravings and mutterings that many were inclined to believe him a madman, although he spoke in the manner of one who has actually survived some appalling catastrophe, and was eventually identified as none other than Sherman Krass, the world-renowned chemist. But it was only because of the outstanding name and influence of the man, and not because any one believed there could be a particle of truth in his fantastic story, that a small party was sent to investigate the patch of beach of which he gave such lurid warning.

When, after three days, no member of the investigating party had returned, the War Department began to take a somewhat more serious interest. And when, after another three days, still another investigating party had gone forth and remained unreported, it came to be recognized with alarm that possibly there was more than a shadow of truth to Krass's narrative. Rumors that the foe had seized the coast in force now began to circulate; it was common gossip that they had found a base for their poison gas attacks somewhere along the California beaches. And it was for this reason that the War Department, now thoroughly aroused, commissioned a fleet of sixty air scouts and ten dirigibles, well equipped with guns and gas-masks, to fly to the alleged military base and attack the enemy in mass.

The experiences of this expedition are among the most memorable of which our records tell us. Few persons have ever received a more bewildering surprise than did the crew of the great air-fleet when, approaching the spot indicated in Krass's report, they found the beach overgrown for half a dozen miles with translucent reddish shoots. But the plants were not twenty feet high, as Krass had indicated; they averaged forty feet or more! And the great purple masses that stood out here and there among them were each as large as half a dozen human heads!

The fleet alighted at a distance of several hundred yards; and a dozen volunteers were ordered to approach as nearly as possible to the vegetation. Their fate, however, might have been foretold; they were still far from touching-distance when there was an eruption of the greenish vapors, and the men staggered, toppled groaning to earth, and were still. Thenceforth, upon the orders of the commander, every member of the expedition was required to wear his gas-mask.

Even with this precaution, however, they found their task no easy one. They did not, it is true, succumb to the gas-attacks, for their masks were of the latest style, and were proof even against the recently developed sulpho-cyanide vapors, one whiff of which would kill a man; but they did find themselves the targets of an attack, even more direct and unexpected in its nature. For, when they strode within the shadow of the reddish vegetation, the invisible seemed to open up its arms against them; long, spine-like blades shot out with amazing speed from concealed scabbards amid

the undergrowth. It would be impossible to give an idea of the swiftness and suddenness of the assault; before they had had time to defend themselves, half a dozen men had been pierced and slain. Some with thorax and abdomen ripped open, others with heads broken and shattered, they toppled to earth, where they lay in crimson masses that quivered for an instant, and then were still. And meanwhile the blades, with poignard-thin edges, curved and gleaming like scimitars, flashed back again into their hidden scabbards.

Thunderstricken, the remaining troops stopped short barely in time to save themselves. Some fled screaming, as though pursued by demons; others remained rooted to the ground, their hair fairly bristling in their fright. To one and all it was apparent that no ordinary enemy confronted them. And to the commanders, observing the horror from safe vantage-points in the rear, the conviction came that the fibrous wall before them was not a wall of vegetation at all, but rather some death-trap contrived with diabolical ingenuity by the foe. For had any such plants as this ever been known before? And had any plants, however strange, ever been seen to strike out like human beings? The idea was unthinkable, preposterous! Accordingly, with the belief that human enemies lay unseen in ambush behind the reddish screen, the leaders ordered a wholesale attack by means of aerial bombing guns, small field artillery, bayonets, and hand grenades. And, as a preliminary to the assault, they directed that the men be all arrayed in those steel coats of mail and helmets which had come to be part of the paraphernalia of modern warfare.

It was the massed attack of several thousand men that brought the greatest surprise of the day. The plant-like growth, though apparently soft and flexible, proved to be actually hard and impermeable as granite! Again and again the attacking bayonets struck with a clatter as of iron against rock; again and again the blades were warped or broken. And the hand grenades and the aerial bombs exploded without causing any visible damage; the shells of the field artillery made only narrow gaps, which closed almost instantly, leaving all as before! The supposed plants were really stronger than steel!

But no sign of a human enemy was discovered by any of the assaulting party. And at length the commanders, turning from the attack in a sort of dazed astonishment, were forced to admit themselves defeated. When finally, baffled and bewildered, they returned home, it was with the report that the enemy had contrived some inexplicably powerful, destructive mechanism, infinitely superior to any previously known.

NOW it was that the world was really aroused. Now it was that scientists and militarists alike began to recognize that the bristling reddish growth represented a discovery of major importance. The idea that it was not a thing of human contrivance, that it was something strange, unearthly, sinister beyond all reckoning, was already beginning to gain credence in certain quarters; and the demand for a thorough explanation and investigation was growing louder and more insistent. The American government, throwing

open its treasury, in alarm that was daily deepening, offered a reward of one hundred thousand dollars to whoever would satisfactorily account for the red plant. And at the same time it provided unbounded facilities, in the shape of military equipment and scientific apparatus, to all who desired to participate in the investigation. Meanwhile, from all sections, a cry of "Make haste, make haste!" began to arise. For an appalling fact was coming to light, a fact that argued incontestably against the human origin of the spiny reddish thing. The "gas-weed," as it was now popularly called, was still growing with phenomenal speed, and had already attained a height of one hundred feet. Worst of all, it was spreading, not only along the beach, but inland, wiping out every other plant as effectively as a prairie wipes out dried grass. An area estimated at over forty square miles had already been conquered by the spreading peril!

It was through the efforts of that celebrated chemist, Sherman Krass, that the world gained its first partial solution of the mystery. Ever since his narrow escape from death at the hands of the unknown, Krass had devoted himself unsparingly to the investigation of the gas-weed. And he it was who first traced its definite connection with the fireball of 1968. Remembering that its first appearance had been in the vicinity of the crater caused by the meteorite, and that it had originally been observed not long after the meteor's fall, he conceived a daring theory which he at once set out to demonstrate scientifically. Tearing apart small fragments of the meteorite and examining them beneath the microscope, he discovered the tiny bean-shaped particles; he also discovered how, when split apart, they displayed curious lines and veinings, not unlike the veinings of a leaf. Next he subjected some of the black dots to qualitative analysis, and in so doing discovered them to be exceedingly complex in structure, composed primarily of a silicon compound, but with the inclusion of quantities of oxygen, hydrogen, carbon and various other elements to be found in organic substances. And yet the silicon was so abundant that, as Krass afterwards confessed, he doubted for a while whether the resemblance to anything organic could be more than superficial. He did not, however, refrain from making a final experiment—and to this experiment the world owes the first great stride toward the mastery of the unknown; he distributed a few score of the black dots in flower-pots filled with a moist sandy soil, covered them with a thin coating of earth, and resolutely waited.

He did not, however, have to wait long. On the following day he observed something red and fibrous just beginning to peep above the earthen surface of the flower-pots. At first he thought it was perhaps merely some chance weed; but he was swiftly to be disillusioned. Even as he watched, he saw translucent shoots pushing themselves out of the soil with movements so rapid as to be perceptible to the attentive eye!

THERE could be no further doubt. The discovery was nothing short of revolutionary! Wild-eyed with amazement, Krass rushed off to broadcast his secret. He had penetrated the enigma of the gas-

weed! He knew now that it was not of this earth! Its seeds had been borne to us by the meteorite; it had issued from some other world, some other universe!

Such was the startling fact that Krass proclaimed. But mankind at large, with its customary scepticism when the unusual is concerned, did not share in his enthusiasm. Many at first smiled incredulously, and declared themselves unwilling to accept a tale that so flatly contradicted all previous experience. How, asked the critics, could a meteorite come to bear seeds within it? How preserve them, so that they were capable of germination after possibly millions of years? And how, even granting their existence, could they sprout upon the earth, in an environment probably totally different from that known to their kind?

To all these questions Krass listened patiently, and to each he offered an answer. Torn from the surface of some remote planet by some tremendous cataclysm, some volcanic eruption, some collision of worlds, the meteor could easily have borne within it a portion of rock or soil containing seeds awaiting germination; and these, if small enough and if fortified sufficiently by ancestral adaptation to extremes of pressure and of cold, might be preserved within the meteor's iron heart, proof against any change of temperature and unaffected by the passage of years. And finding on earth a propitious environment—which is to say an environment that included sunlight, air, and a moderately warm soil—they at once were brought to life, and developed as readily as though on their native sod. In all this, as Krass took pains to make clear, there was really nothing extraordinary, any more than in the importing of an Australian plant into North America, or of a North American plant into Australia; the real marvel was that such a transplanting had never happened before, unless, indeed, it had happened a thousand times without our knowing it, and was one of the obscure causes of the origin of species.

Within a few days, a number of other extraordinary facts about the gas-weed had been made public by Krass. For one thing, he had conducted a chemical analysis of the young shoots, when they were still relatively soft and tender and had not attained anything of that steel-like rigidity characteristic of the developed plants. He had discovered that, in common with the seeds, they were composed of a silicon compound, so highly complex that its chemical formula defied analysis, and differed fundamentally from any other substance ever known on earth. Krass's theory—based, it is true, upon incomplete researches, but later thoroughly substantiated—was that the gas-weed had a totally different chemistry from any terrestrial organism: instead of the chlorophyll common to all green plants, it had a reddish pigment which enabled it to utilize the sunlight as a source of growth; while, in place of the well-known protoplasm, with carbon and nitrogen as its basis, it had a molecular construction equally elaborate, but with silicon as the essential ingredient. This, in Krass's belief, explained not only why the weed thrived so well in the sandy soil of the beach, where silicon dioxide existed in inexhaustible quantities, but why it was able to build up walls of the flinty construction for which various silicon compounds

are noted. Such are the feldspars, trap-rock and others.

And this also explained, in the view of scientists, why it was a thing so difficult to compete with, a thing inimical to human life. For that it was inimical to life, as much in the rôle of aggressor as when deliberately attacked, was fast becoming manifest. Apparently thriving upon success, the plant had continued to develop at a rate that would have been deemed impossible had not the sober facts forbidden denial. From occupying forty square miles of territory, it had come to spread over eighty, then over a hundred and twenty, then over two hundred, then over five hundred, then over a thousand square miles! And this vast conquest was accomplished within a period of weeks! No army known to history had ever subdued territory so utterly and so indisputably. Advancing away from its first field of attack, it was spreading inland, was moving over cultivated ground and crowding out orchards and vineyards as easily as forest trees crowd out grass. Even houses and small towns were not immune to its attack; they disappeared before it as mysteriously as though they had been but phantoms; the translucent ruddy shoots would weave their way through brick and wood, seizing all in a strangle grasp and grinding it to fragments; and when the advance guard had once arrived, in a few days there would remain only a tall reddish tangle, with here and there a purple head-shaped mass, uplifted like the face of some inscrutable sentinel watching and warning. . . .

THE worst of the matter was that the devastation did not confine itself to a single area. Bad as it was to see a section of the fertile California seaboard succumbing to the invader, it was inconceivably worse to find a dozen, twenty, fifty spots falling victims. How the terror could spread into widely separated districts was not at first apparent, but ultimately an explanation did come. The plants, as Sherman Krass discovered, were already putting forth seeds; and these minute black particles such as he had already investigated, were equipped with tiny down-like wings, much like the wings of dandelion-seeds, except that they were lighter and might blow even further afield. Thus, as the facts incontestably showed, they had been borne fifty, a hundred, in some cases two hundred miles from their point of origin; and, in widely scattered regions, among the orange groves of Riverside and in the fig orchards and vineyards of Fresno County, the gas-weed had lifted its rank growth, laying waste some of the richest agricultural regions of the State, and spreading, spreading, spreading, always silently and malignantly spreading.

It was less than six months before the intruder had ceased to be recognized as a matter of merely local concern, and in many quarters had come to be regarded as a world-wide peril. In some way that has never been positively ascertained—whether due to the chance passage of the seeds on the person of some traveler, or to their deliberate transportation as a means of military aggression—the gas-weed gained a foothold first in Europe, then in Asia, then in Africa, then in Australia. Before long there was no part of the world, civilized or uncivilized, that did not know its baneful presence.

It showed itself able to thrive equally well in any climate and in any soil containing silicon; it began scrambling up the arid mountains of Southern California and Arizona, apparently indifferent to the scarcity of water, and was even reported in the saline waste of the Great Salt Lake desert, and among the dunes of the remote Sahara; it flourished on the sides of stony mountains, sending its roots deep down into quartz and flint; it inhabited the clayey valleys of rivers, and among the tundra of Labrador it began to lift its head as though it were in its native habitat.

Slow as the world in general was to appreciate the scope of the menace, the second six months brought warnings not to be resisted. For there are some pleas which speak more forcefully than words, and which no man has ever been known to deny; and one of these was to be found in the famine that slowly, stealthily followed in the wake of the reddish invader. The world's food supplies, depleted by the most exhausting war in history, would barely have proved adequate in any case; and the drain caused by the added destruction proved as decisive, as would a sack of lead placed on the back of a tottering laborer. Starvation, already threatening to descend, suddenly reached its bony hand over all realms; wheat and potatoes rose so sharply in price as to be beyond the range of the common man; meat, because of the extensive destruction of grazing land, soared until it had become a luxury of luxuries. And now only the well-to-do went their way without feeling the hunger pangs, while in every city on earth the poverty-ridden thousands, standing in line for a plate of soup or a scrap of barley bread, cried out in vain for that with which to appease the clamor of their gaunt and shrivelled babes, of their worn and weeping women-folk.

"End the war! End the war! End the war!" was now the cry in all lands. For while Hunger, with its accomplices, Looting and Riot, went rattling its skeleton fingers about the earth, the lords of empires, themselves with ample bread in their pantries, were still urging their underfed minions forward with bomb and bayonet. And meantime men of science, debating behind locked doors, whispered the opinion that the war must automatically come to a close; but that, even so, only heroic measures could save the human race.

It will be needless to comment upon the further events of those tragic days. There would be no object in enumerating the hundreds of thousands that perished of starvation in China, in Soviet Russia, in England, in India, in the United States; neither would there be any gain in outlining the course of that great pestilence which attended the famine, and which for a while converted the surface of whole continents into a purgatory defying description. Better to pass over these unhappy events, beside which the Black Plague that once depopulated Europe would seem like a backwoods epidemic; better also not to detail by what steps the predictions of the wise were fulfilled, the man automatically had to abandon the war upon man, in the throes of the still more desperate war for racial survival.

The all-important fact is that the time did come when all the remaining energies of our kind were directed toward the problem of the gas-weed. But how attack

that problem? How compete with a foe whose armament was so impregnable, whose methods of combat so different from anything previously known on earth? The heads of the various nations, in a conference wherein for once political bickerings were forgotten amid an atmosphere of terror and despair, agreed upon every possible agency of international cooperation: chemists and botanists in large numbers were to study the gas-weed; enormous prizes were to be offered for every important discovery: the laboratories of all lands were to be thrown open to research workers, and the results of their studies were to become the property of all nations alike. So far, so good!—but what if there were to be no results from their studies? So some of the pessimistic inquired, for still the days went by and nothing encouraging was announced, and still the gas-weed, with its prodigious fecundity, kept spreading over garden-land and desert alike, devouring, devouring, devouring, insatiable in its greed for prey.

It is impossible to estimate how many brave men, venturing forth to study the gas-weed, perished of its poisonous exhalations or beneath its spiny sabres. It is impossible to compute how many others took their lives in despair, how many died in madness, how many succumbed to pestilence and famine. There is no means of gathering such statistics, for mankind, in its deathly grip with the invader, could no longer give a thought to the mere numbers of the casualties. All that we can say with certainty is that no less than nine-tenths of the human race had been extinguished, and no less than one-half of the world's arable lands had been laid waste, before chance brought that solution which no man's ingenuity had been able to contrive.

IN an obscure laboratory connected with an eastern medical college, a young physician, Francis Leighton by name, had been conducting researches into the cause of cancer, a disease which had been gaining in virulence of recent years and still seemed far from being vanquished. At the time of the appearance of the gas-weed, Leighton had been gathering cancer cultures in various tubes and jars and artificially feeding them in preparation for microscopic study. But, upon the world-wide development of the new menace, he had turned reluctantly from his cancer researches into the still more difficult research into the nature of the gas-weed. He had acquired a few flower-pots filled with the young plants, whose seeds and translucent shoots he had laboriously studied; but within a few days, like so many investigators, he had found that his laboratory specimens were fairly running away with him, were threatening literally to eat him out of house and home! Being inexperienced, he had not taken the precaution of destroying the young plants with nitric acid during the first three or four days of their growth, when they were still too tender to resist that devouring reagent; and after the first three or four days, when neither fire nor water nor any chemical known to man had any effect upon them, the gas-weeds dug their clutching roots through the clay of the flower-pots into the wooden floor of the laboratory and the stone foundations, and, drawing nourishment from that difficult source, expanded so rapidly that they seemed likely soon to fill

and destroy the building. It was no trifling matter.

But young Leighton, watching in horror as the pest spread uncontrollably, could hardly have known that for once the very rapacity of the foe was to betray it. In his consternation, he did not remember the cancer cultures, which stood unnoticed beneath glass cases in a dozen parts of the laboratory; but the gas-weed, whose hungry grasping arms could overlook nothing—and least of all the silicon-bearing glass—was not slow in finding out that which Leighton had forgotten. The tough reddish tendrils, reaching the first of the glass coverings, forced their way through it as though it had been made of straw, bursting it into a thousand fragments, and proceeding greedily to devour it.

But for the first time the intelligence of the gas-weed—if the uncanny force that guided it can be called intelligence—had been guilty of a miscalculation. And the results of that miscalculation were soon to become apparent. No one at first even remotely surmised the cause; yet a change, an extraordinary change, had come over the plant. Within a few hours the ends of the tendrils, though immune to attack by dynamite or steel, began to crumple up and wither; enormous green-black swellings commenced to appear at a hundred points among the wilderness of shoots; the huge purple head-like masses sagged and contracted, and faded to a pale, sickly yellow; faint, scarcely discernible noises, like a low moaning, could be heard as the writhing reddish arms threshed one against the other in what observers declared to be like the death-agony of some sentient creature.

And a death-agony it surely was! Within twenty-four hours, every evidence of life had vanished from the gas-weed. In a fallen, shrivelled, blackening heap, loathsome but harmless, it lay upon the floor of the laboratory it had come so close to annihilating.

What had happened to the terrible weed? Leighton, observing in amazement, was at first too bewildered to understand; and it was only by slow degrees that the explanation dawned upon him. The cancer cultures! They had been his saviors! In some unaccountable way, they had attacked and conquered the unconquerable!

Leighton's first impulse was to proclaim the news from every house and hilltop. But, being naturally of a cautious, scientific turn of mind, he restrained his impatience until he had hastily conducted other experiments. Securing new cancer cultures, he deliberately exposed them on the path of the gas-weed—not one time, but fifty! And in every case he got the same result! Within half a day the plants would begin to wither, would develop enormous, hideous swellings, then they would blacken and die!

But why did the change come about? Leighton could not answer, nor could any of the scientists who studied the question. The most that they could state was that the cancer cells, possessing some peculiar property inimical to the life of the gas-weed, had found in the plant an exceptionally fertile soil; while the plant in its turn, having an inherited immunity to all perils except this alone, had not the necessary resistance. One circumstance only was easily explained: the fact that its incredibly hard exterior did not protect it; for its

surface, as observers discovered upon investigation of the remains, was covered with a multitude of tiny breathing places or pores through which the cancer cells might readily have entered.

But whatever the complete explanation, the significance of Leighton's discovery was clear enough. The ancient enemy of mankind had become its deliverer! With the aid of our old foe, cancer, we might strike down the invader!

And with the aid of that old foe, we did indeed strike down the invader! Like wildfire the news of Leighton's findings spread around the earth; and, for the first time in history, cancer patients came into big demand. Operations were performed wherever possible upon victims of the disease; and the cells, dropped from airplanes among the vast jungles of the gas-weed, were scattered far and wide to do their deadly work. And never once did they fail! The plants, withering and

blackening, began to recede as rapidly as they had appeared; over areas of thousands of square miles they were exterminated, until not one living trace of them remained!

Five years have now passed since the appearance of the pestilence. Today no gas-weed survives, except in a few mountainous and desert regions, and among the frigid wastes of the Antarctic Continent, where their destruction is of but slight importance. But even these, it is believed, will be blotted out within a few more passing years.

And meanwhile humanity, left gasping and bewildered on the very verge of extinction, has been courageously husbanding its few remaining resources, still trembling at the doom it has avoided, and yet daily offering up prayers that the heavens shall not open again to cast down some new freight of terror that man may not be able to resist.

THE END.

The Seventh Generation

By Harl Vincent

TALES of the distant future are always welcomed by our readers, and we admit a secret hankering for such stories ourselves. What future wonders are in store for the human race? What are we heading for? Would it not be a wonderful thing if, by some sort of radio astronomical machine, we would be able to tear away the wall of our future and take a peep at our future generations, and study their behavior and their handiwork? This is precisely what the author is depicting in his present story. It is an exceedingly facile tale, with a dash of romance, adventure, hair-breadth escapes and all the other elements that go to make a successful story. You will wish to re-read this story many times.

This story is published in the Winter Edition of
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The Hollister Experiment

By Walter Kateley

WHAT causes dwarfs and giants? Science to-day tells us that either is caused by glandular disorders, but what makes a whale or an elephant enormous, and why doesn't the cat or rooster take on the proportions of elephants or whales? That is something science is not prepared, as yet, to exactly explain.

Dwarfism or giantism can be artificially produced, however, and the time may not be far off when it will be possible to artificially breed animals or human beings to almost any size desired within reason.

In the present story, the author, who has a deep insight into this branch of science, is presenting our readers with a capital story that will make you gasp for its sheer daring.

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The MOON STROLLERS

By J. Rogers Ullrich

CHAPTER I. The Astronomical Club

IN a little shack hidden deeply in the Vermont mountains, a group of amateur astronomers were gathered around the fireplace for their after-supper discussion. Comprised mostly of engineers or manufacturers from New York or Boston, they journeyed up there into the mountains for a few days each year—a few days of play, in which each could pursue his hobby and forget the cares of big business.

The shack was built of logs from the surrounding pine forests and besides sleeping quarters, it contained a living room, a kitchen, and a laboratory. In the latter, which was splendidly equipped, much time was devoted to lens grinding and the construction of telescope mountings, for the rules of membership required each man to make at least a 6-inch reflector with his own hands.

A truly stag club this, where the blue flannel shirt, the old corn cob pipe, and a week's growth of beard needed no apology. A roaring fire crackling on the broad field-stone hearth, the semi-circle of gray heads, the blue coils of pipe smoke—one can picture this scene and can imagine the scientific discussions which were often interrupted by bantering, which would bring forth roars of laughter from the circle. Among the group was young Scofield, a brilliant and imaginative engineer, only ten years out of Boston Tech, but already giving promise to exceed his famous father in the daring of his engineering work.

Scofield, who usually led off the discussion, had been very moody during supper, and now that there was a pause in the desultory conversation, several pairs of eyes naturally turned toward him. Finally "Old man Donnelly" threw out the bait. "I say, Fred, now that the Goddard rocket has at last made a fair hit on the moon, what is the scientific world going to do about it?"

"Going to do about it," echoed Scofield, roused suddenly from his reverie as if dashed in the face with cold water.

"Why, man, within a week a thousand fools will be begging and pleading to make the trip."

"Think of it!" And then, after a brief pause, in which all eyes and ears were now his.

"And I would like to know if they expect to get out of the rocket and skip around the moon picking flowers?"

"They would have to wear their red flannels, Fred, at a temperature of 200 degrees below zero, and I suppose the lungs would freeze solid before one could attempt to take the first breath of the scanty air."

"Yes, that's the main difficulty to overcome, but let us develop this thought a little further. Now, gentlemen, this may seem very fanciful, but just for the sake of something to talk about, let us suppose that a couple of men live through the journey and reach the moon's surface. What then?"

"I have thought of all that in detail," interrupted Dr. Mueller, the chemist, at this point, "and the only thing that really worries me is the heart action. If we could be sure that the circulatory system is partially independent of the force of gravity, it is easy enough to supply the rocket with an abundance of good pure air and we could, therefore, be fairly certain that the men would live comfortably for the entire duration of their journey in the rocket."

"Yes, that is a vital factor, but to continue the thought I was developing," replied Scofield, "here we are, safely landed on the moon, and peering through a tiny window upon a new world (or old world, to be more exact) bathed in blinding sunlight. Cooped up in the helpless rocket, death would soon follow unless they could emerge to get fresh supplies from a cargo rocket or at least shovel their own rocket out of the sand and prop it in an upright position, thus making it ready for the return shot."

WHAT would be needed, is a sort of metallic suit, which each

traveler could don, a suit impervious to the intense cold of space and containing an adequate air supply to last at least four or five hours at a time. I have in mind a contrivance resembling somewhat that recent invention for deep sea diving. Let us call it the 'moon stroller.' It could be of heavy construction, since objects on the moon's surface weigh but 1/6 of that on the earth. Probably of pressed steel, electrically welded and insulated with an elaborate cellular lining of vacuum units. Within the stroller I would have oxygen cylinders, escape valves and a chemical purifier to absorb the poisonous exhalations."

SOME of the recent experiments made with cobalt steel bring the possibility of interplanetary travel closer to our time than it has ever been before. It is not amiss, therefore, to begin planning what a lunar expedition might require after it landed on the Moon, for instance, and to wonder how the explorers would get about on our satellite, which has practically no air, and whose temperature at all times is very near absolute zero.

The author of this story has used, not only his imagination, which seems very fertile; but he has also employed science, for he bases a good part of the story on the latest scientific discoveries of this age.

It is an extremely absorbing tale and well worth careful reading.



Heretofore they had walked in a sort of soft palpable dust which went up to their knees, and their progress through this age-old dust was difficult. But now they had come to a rocky plateau, and for the first time became aware of the low gravitational attraction of man.

"All easy, all easy so far," muttered Dr. Mueller.

"If we judged the insulation imperfect and the man were in danger of having his feet frozen, he might wear a complete suit of felt lined with fine electric heating wires, similar in arrangement to those worn by aviators when climbing for altitude. Including a compact storage battery, oxygen tanks, wireless receiver, we might keep the total weight down to between 300 and 400 pounds. Let us say 60 pounds moon weight plus 30 pounds personal weight, giving a total of 90 pounds to skip over the surface.

"You men who are already showing paunches and taking collars two sizes larger; how would you like to have your 200 pounds reduced to 90 pounds, and hop and jump from rock to rock, making bounds 20 feet high or more? It would be exhilarating, I'll say!"

"You have all seen athletes and classical dancers in slow motion pictures. I never see that without thinking that the same gravitational conditions exist on the moon's surface."

"Now, gentlemen, this is my proposition. You know that the Smithsonian Institute has just received a big government appropriation to carry on these rocket experiments. In the meantime, our club will secretly construct two strollers and when completed, we can announce their practical use and availability for the first moon explorers."

Scofield paused for a moment to gather up his threads of thought.

Donnelly was the first to applaud.

"Fred, you are exceeding yourself to-night. Your idea interests me tremendously and my plant with its 9,000 auto bodies per day capacity stands ready to take care of the pressed steel casings and welding!"

"That's fine, and that disposes of the first part!"

"And you, Dr. Mueller. In your chemical laboratory a very compact air supply apparatus must be designed as soon as the blueprints are ready and you can figure out the exact space we will allow you!"

"We will take care of that readily enough, Fred, but there is one vulnerable spot in your iron man. How about the arm and leg joints?"

"I expected that question to be raised. It involves a neat little job of engineering, but the problem has already been half-solved in the deep sea diver."

"Burroughs, you seem to be sitting up and taking notice. You manufacture electric refrigerators. How about working out our insulation difficulties?"

"Well, Fred, you know it is a very different matter to insulate your tin can against absolute zero than to insulate one of my ice boxes against 90 degrees on a summer's day. However, there are several ways to pretty accurately test the thing, and it is not beyond our ability to obtain security against the low temperature of the moon's surface."

"Atta boy, Burroughs! I see you are thinking ahead of me already."

At this juncture, the conversation broke out spontaneously, stimulated as it was by Scofield's fancy. He leaned forward eagerly, eyes brilliant, trying to catch at once every thread of thought, at the same time jotting down notes in a tiny book with a little silver pencil. After a time, however, the interest lagged, the men

grouped themselves according to their hobbies, some left the room for the laboratory, while others went out into the clear starlight to unhouse their telescopes.

Scofield remained alone before the dying embers, thinking.

CHAPTER II.

Building the Strollers

WEEKS and months passed. Hours upon hours of designing and calculating over the drafting board finally evolved complete plans for the moon stroller.

"A brilliant piece of engineering by Frederick Scofield," quoted *Science and Invention*. "Not in a generation have we seen anything to equal it from a man so young. Yet, coming from a line of noted engineers for several generations, we could hardly expect anything but exceptional work from Mr. Scofield."

The fabrication of the strollers was undertaken by the astronomical club with vigor and enthusiasm. Pressing and welding of the outer and inner cases, packing the intervening space with the vacuum units in triple layers, the air supply, the heating wires, the telephone and radio receivers, each part had its technical advisor. It represented the last word in scientific research and engineering.

When completed, the two strollers hung from cranes on steel cables fastened into rings on their helmet tops.

Burroughs volunteered to demonstrate the perfect insulation by remaining in one stroller several hours while it was immersed in liquid air at 190 degrees below zero. Not satisfied with this test, he next heated the empty interior to 1,400 degrees with an electric arc, in an effort to melt off a coating of frozen carbon dioxide. The results were beyond expectations. It was another triumph for refrigeration.

Communication between the steel men was maintained by a pair of headphones and a short length of telephone wire plugged into each helmet. A short-range receiver was also installed.

The operator entered the stroller through the shoulders, the helmet being screwed down then, after the manner of a diving suit. A window consisting of triple pieces of glass, with two intervening vacuum spaces, and giving a range of vision of 180 degrees provided adequate power of observation to the front and side. The arms terminated in a ball and socket joint to which was attached a pair of steel claws. Even the handles which manipulated the claws from within were ingeniously insulated against the cold.

CHAPTER III.

The Moon Rocket

THE making of the first man-carrying moon rocket is a long story, now perfectly familiar to the reading public. It has become a matter of history. The series of experiments were given their first impetus by the German rocket airplanes, successfully designed for the Berlin-to-New York air service.

After the firing, the control and the propelling forces were definitely known and established, construction of the moon rocket became a logical sequence. Its scien-

tific need was an accurate study of the moon's geology still imperfectly understood. The earth's life history from beginning to end would thus be known by analogy, since the evolutionary process on our satellite has made its complete cycle.

Space does not permit, nor would the reader want us to relate once again the long details of this enthralling story. Let it be sufficiently understood that the first choice to take passage on this perilous adventure went to Scofield. As in Verne's prophetic story, "A Trip from the Earth to the Moon," three passengers made the journey. It was generally agreed that Dr. Mueller, the chemist, because of his profound knowledge of aeronautics, should be second choice and Professor Kenworthy, noted astronomer and mathematician, should be the third.

The agony of the initial shock, the throbbing temples and racing hearts, the problem of living and functioning and even thinking, when the weight was naught—all these details we will pass over.

Housed in their narrow quarters, each of the travelers had their assigned duties: Kenworthy, a small and nervous type of man, forever calculating and paging his volume of logarithms; Mueller, stolid German scientist, near-sighted, depending on smell and taste, quite as much as on eyesight, pottering among his tanks and valves and gauges; Scofield, impatiently studying the dial board, which automatically registered the discharges and the progress of the rocket.

Time passed swiftly enough. At last the topography of the moon spread before them. Comparing detail by detail with the government lunar atlas, they speculated where the projectile would land, whether in the crater of a volcano, on the high table lands, or in the treacherous and rocky Apennines.

It was now a matter of hours. Scofield stood at the recoil chambers ready to fire the retarding charges when Kenworthy, with stop watch in hand, gave the signal. Mueller sat musing over the fact that the present air supply was purer than the chlorine-charged atmosphere he had breathed on the U-boats during the World War.

It was now a matter of minutes, then of seconds, then the shock of the recoil; a second and a third shot and crash! They had landed.

CHAPTER IV.

Preparations for the Great Adventure

MUELLER was the first to speak, "Fred, Kenny, are you all right? Well, well, at least act pleased that your brains were not dashed out on the rocks. Landing on the soft sands of the *Mare Serenitatis* is wonderful luck. All we need now is another shot and we will pop up upon the surface like a sand crab coming out of his hole."

Scofield smiled wearily and said, "Brace yourselves. Here goes the last shot." And in an instant the rocket raised itself out of the sand pit and fell heavily on its side, rolling over once or twice before it came to rest.

The men scrambled to their feet and with one accord peered through the heavy glass port, the outside steel shutter of which Scofield opened by touching a button.

What a sight for mortal eyes to see! Sand, rocks, utter desolation all bathed in dazzling yellow sunlight, with shadows black as ink.

Muelier spoke first again, "I for one am not going out into that blinding light. My grey Nordic eyes won't stand the strain. Besides, what do I care for scenery. Just bring back to me a few hundred samples of sand, gravel, stones, rock crystals, lava, anything worth while to put in these little bottles." And smiling he showed in their cases some 500 wide-mouthed glass stoppered bottles all numbered and labeled.

"We have plenty of tools, spades, picks, buckets and blasting powder, but before we do anything else, let us set a flare to let the home folks know that we arrived safely."

Involuntarily they all looked up and were just able to see the earth through the tiny window. It seemed no more than a thin crescent.

"Fred, I suspected the radio wouldn't work in spite of your tinkering. It must have been damaged at the start. I am not an electrical engineer, but I have a piece of black silk 400 feet square tucked away among our supplies and I do know when that is spread out on the sands, the Yerkes refractor will instantly pick up the signal. Furthermore, I have an abbreviated code of dots and dashes, copies of which our government sent to every large observatory. It is very comforting to know that at this moment at least a hundred telescopes are scrutinizing the moon for our message of safety."

"Well, you certainly are thorough, Professor," responded Scofield. "But, how will the earth reply to our messages?"

"Surely you haven't forgotten that we have an 18-inch lens which will pick up the earth signals. A fleet of destroyers on the Pacific will throw a smoke screen 10 miles square. By this simple means, which is an old idea, they will notify us when and where our supply rocket lands."

"Anything else?"

"Nothing, thanks. What I do want to know now is the external temperature."

"How about that, Doc?" this from Kenworthy.

"I am testing that now, gentlemen, and according to my instruments, it is 227 degrees Fahrenheit below zero at nine feet above the surface. There is, as I long suspected, a trace of atmosphere, for in this sea bottom a foot above the sand, the thermometer records only 152 below. I believe that in the deep crater pockets, one could leave the stroller for a brief time with only the portable oxygen helmet and a heavy suit of fleece-lined clothes. If the presence of hoar frost has been observed rightly and the minute traces of green indicate a lower form of vegetation, some very interesting things are to be found. It is comfortable here with the warm sunlight pouring into the rocket from four windows, but remember we have but eight days left before the coming of the long lunar night—pitch black, bitter cold. You two must get out at once and signal the earth. We must do our exploring, await the arrival of the supplies, recharge, set up our rocket in the starting frame and be off before the sun sets beyond the distant mountain peaks."

"How about the other side of the moon, Professor?" questioned Scofield, whose imagination was always groping beyond.

"Fred, I don't think it is worth while exploring. Besides, if in past ages there was a civilization, it probably settled on this side to take advantage of the earth light during the long lunar nights."

"By the way, Doc, if you stayed out half the night playing chess at your Chemical Society, as you do once a month, and it was here on the moon, you would be away from home about seven earthly days. Fraeulein Mueller would probably be waiting for you with a cylinder full of hydrogen sulphide, wouldn't she?"

Mueller sighed deeply. "This stag party is simply grand, but I miss her good German cooking. Campbell's soup and G. Washington coffee heated on an electric stove with the pots bolted down so they won't float away is getting on my nerves. Cook and air maker! What a combination!"

Thus terminated the first moonly conversation. The three explorers sat in silence around a swinging table and ate heartily of a meagre meal.

Kenworthy was the first to climb into the stroller. Scofield fastened down the helmet and assisted him to stagger into the air lock, a small chamber aft connecting with the outside. The inner door was closed and sealed. They could hear a faint hiss as the stroller's steel claw fumbled with the outer door bolts. It yielded, and he slowly stepped out and closed the door.

Mueller and Scofield eagerly watched the iron man making his first steps, or rather bounds, on the moon. He turned immediately and waved that all was well.

"Magnificent, my boy!" shouted Mueller, patting Scofield on the back.

"Hurry into your suit, for I am going out there, even if I go blind in the attempt. You would probably not recognize quartz from lava and my sample bottles for the institute must all be filled."

"Scofield followed him a few minutes later, while Mueller replaced the loss of air by opening a valve and watching an indicator needle re-register 15 pounds to the square inch.

CHAPTER V.

Exploration—The Hidden City

OUR explorers decided first to make a short excursion around the rocket to test the strollers and get a general idea of the character and topography of the soil. They sank deep in the soft yellow sand and the glare of sunlight was so blinding that dark glasses were immediately adjusted. Scofield plugged into the Professor's helmet and they held conversation.

"Fred, we had better get Mueller to shove that powder flare out to us. We owe our first duty to the anxious folks at home."

Accordingly they returned to the rocket. Mueller had anticipated their thoughts, for in the outer chamber was the box of flash powder, a coil of wire and detonator and the bundle of folded black silk.

The flare was set off some distance from the rocket. It burned for five minutes with a blinding light. Spreading the big piece of black silk was the next job. After

that they felt greatly relieved, conscious that the messages would be promptly seen and straightway broadcast to friends and relatives.

In the meantime the doctor had placed the telescope mountings and lenses in the air lock and while awaiting the return of the explorers, exhausted the outer chamber of air with a hand pump. He did not care to lose the 70 cubic feet of atmosphere every time the door was opened.

The rocket had landed, as we said before, in that great sea bed known as *Mare Serenitatis*, lying in the moon's northern hemisphere. To the southeast lay that lofty range of peaks, which resembled a shark's teeth and is known as the Apennines, and a little beyond the mountains was the volcano of Copernicus, surrounded by a series of lunar canyons known as rills.

Kenworthy proposed to explore thoroughly those great sea basins which are visible from the earth with the naked eye. It would be there, most likely, that the last traces of water, atmosphere and vegetation would be found. Accordingly, he led Scofield across the dark grey ooze, the accumulation of millions of years, and now baked hard as sand stone. They proceeded toward the west. In the distance the gigantic crater of Proclus towered 14,000 feet as a great white beacon. These guiding posts were perfectly familiar to the astronomer, who had memorized and photographed every visible detail. As they advanced, Scofield noticed that the land descended in successive terraces and grew darker step by step.

Heretofore, they had walked in a sort of soft impalpable dust, which often went up to their knees. And their progress through this age-old dust, therefore, was difficult.

But now, they had come to a rocky plateau and for the first time became aware of the low gravitational attraction of man; where heretofore, it had been difficult to walk on account of the deep sand or dust, it now became a veritable pleasure. Even encased as they were in heavy strollers, their weight, now that they were on the moon, had decreased to such an extent that the slightest effort sent them high up in the air. A jump that would have been impossible on earth, with the heavy stroller, and which, at the most, would have been a few inches, now became a leap over three feet high. For a while the explorers deported themselves in these incredible jumps. It was a good thing that the telephone connecting line was long and flexible, because otherwise the wire would have become disrupted. It was certainly a strange experience, as they floated up over the surface of the moon, to keep up a running conversation 25 to 35 feet above the rocky strata. After they had sufficiently amused themselves, and after they had adjusted their gait, which even then had to be carefully regulated so that not too much force was used in walking, they began their explorations in earnest.

Arriving at the center, they felt that they were in a bowl, and Kenworthy estimated the elevation at about 6,000 feet below sea level. This point, he felt, would be the last stand of life and evolution. He set to work digging a hole and inserting a charge of specially prepared blasting powder. They saw the flash and dis-

tinctly felt a concussion, but it seemed odd to hear no sound. Scoefield unfolded a canvas bucket and they quickly filled it with fossil fish, shells and pebbles of various shapes and colors. Scoefield was amazed and plugged into the professor's helmet to give vent to his excitement.

"Say, what will Mueller think when he sorts over that bucket full of shellfish?"

"This area I have had under close study for years. It was a tremendous piece of luck that we landed so near. It undoubtedly is one of the most ancient seas on the moon. I am going to blast again over near that ridge and then we will climb that elevation and study the surface very closely. When the seeing has been especially good, I have examined it repeatedly with the Yerkes telescope under the highest magnification."

The professor gave no evidence of his own excitement except to become very formal and exact in his statements, as if he were addressing his large classes in Chicago University.

"We will proceed to place our next charge a little deeper and I can assure you, Mr. Scoefield, the force of explosion under the altered condition of lunar attraction will create a veritable crater."

It was just as he said. The explosion opened a veritable crater and bounding down into the pit, they dug vigorously for a few moments. A greater quantity of fossils were unearthed this time and Kenworthy poked around among them for nearly half an hour in silence. Suddenly he jumped up to a higher mound, where Scoefield was collecting, in piles, various sizes of crustacea. He held up something very strange in his steel claws. It was distinctly the head of a fish with the eyes on the top like a flounder. Projecting from between the eyes was a long green prong.

Scoefield plugged in. "Well, professor, what is remarkable about that?"

KENWORTHY stiffened in his formality and replied, "I shall now proceed to trace for you the life history of the vertebrate which I hold up for your inspection. Once upon a time this was a foolish little fish which came too close to the shore line. A fish hunter, (please note I did not say fisherman), sitting on a conveniently projecting rock, thrust a copper dart at Mr. Fish and struck him a beautiful blow between the eyes. While in the act of pulling in his catch, a much larger vertebrate came along at this moment and bit off the entire body of the fish. Our hunter was so astonished that he let go his line—a very, very foolish thing to do, as I can testify from personal experience, but lucky for us. What was the result? The head and dart sank down into the heavy ooze at the bottom of the sea perhaps a thousand feet and was fossilized. It now gives us a valuable clue, after countless centuries have passed."

"What next, professor?"

"We will leave these pits at once. Mueller will come here and complete our work. Let us climb to that flat ridge, which borders the sea and stretches back to Mount Proclus. As we progress, you can see the salt incrustations along the banks, an indication of the lowering sea level, after countless years of evaporation.

Also, please note that the character of the soil is changing. We are no longer walking on the ooze but on fine yellow sand. A little further on, the sand will become fine as pumice, in fact, it changes to volcanic dust. The west winds from that great volcano have probably raised the level here ten or twenty feet.

They sank ankle deep into this dust, light and fluffy, almost like snow.

"Surely here is the Naples of the moon, with Mount Vesuvius in the distance, the bay of Naples to the east and the buried cities of Pompeii and Herculaneum anywhere in this vast plane. Running from this point due south and then to the west, you can see a faint rectilinear arrangement of mounds and ridges. It can be seen from the earth on exceptional nights. Lowell and I spent an evening studying it at Flagstaff. But it was during the last few years of his life and we wanted to avoid any more ridicule, so the matter was not published. That is a hidden city! We will make the find and future generations can dig out the records."

Scoefield, speechless in amazement as these wonders unfolded themselves in rapid succession, dumbly assisted the professor to dig a deep hole for the last blast.

They hurried, bounding and sliding down the sides till they reached the bottom, an area about 50 feet across and smooth, as if swept clean, revealing huge paving stones cut square and fitted accurately together.

"This," continued Kenworthy, "is a part of a street and if we dig either to the left or right, we should strike a wall."

In fact, upon a closer inspection of the mound, they found a corner of the wall just projecting above the surface. Scraping a little sand away, heavy lava blocks in regular courses gave one the instant impression of Incan or Aztec architecture.

Kenworthy backed off a little and snapped a dozen yards of motion pictures, showing Scoefield digging away the sand and revealing a beautifully carved doorway. It was barricaded with enormous boulders, probably the last stand against an ancient enemy.

At that instant the head-phones began to buzz and switching on the radio receiver, they heard Mueller talking from the rocket.

"I say, you men have been gone three hours. How much longer do you expect your air supply to last?"

Scoefield answered by pulling his phone jack out of Kenworthy's helmet two or three times, indicating all was well and that they were returning.

Back to the rocket they trudged, weighed down with specimens for Mueller's "damn bottles," as Kenworthy called them.

IN the meantime, Dr. Mueller busied himself with making the rocket shipshape, for in spite of every precaution the supplies were in chaos. When the rocket passed through that short part of its journey in which every object lost its entire weight, the travelers contended with conditions both perplexing and distressing. They were seized with fits of nausea and dizziness while floating around the rocket in a semi-conscious state. Scoefield had strapped himself in front of the dial board, Kenworthy was in a stupor and Mueller too sick to try any stunts of tying ribbons of water into

knots or doing any of those odd things which the physicists tell us could be accomplished under similar circumstances.

In consequence, Mueller's first act was to let out the bad air and besides the caustic soda he spread around powdered charcoal to absorb the noxious odors. The supplies of food, the working tools, medicines, water, the quantity of oxygen remaining in the tanks, all these things were gone over and before he knew it, three hours had slipped around. He suddenly realized that he was very lonely, anxiety seized him and he called the explorers. After hearing Scofield's click, click he felt reassured and thought no more of the men until he heard the outer door of the air lock slam and Kenworthy tapped to be admitted.

Scofield came in last with two large canvas buckets bulging with specimens. Mueller's joy was unbounded, for he immediately held a long discourse with himself in scientific German, hardly a word of which either of the other men understood. He held up the minerals and fossils one at a time as if lecturing to a class. Each was given its most technical terminology and those pieces which could not be identified, he named in turn after the three explorers.

In the meantime, Scofield and Kenworthy, having refreshed themselves with food and water, stretched out on their air mattresses. Lulled by the chemist's droning voice, they soon fell into a profound sleep.

CHAPTER VI. Lost on the Moon

"TODAY, Fred, we are going to explore that great crater of Copernicus, named after the Polish astronomer and visible from the earth with the naked eye. Fortunately, it lies to the south-east of us and by skirting along at the foot of the Apennines, we should come to it in a little over an hour.

Bounding and hopping along, the explorers made their way rapidly southward and then bore toward the east until the majestic mountains suddenly loomed over the horizon. The terrain now became exceedingly difficult to traverse. Here and there were great boulders of rock tumbled into the plains by volcanic eruptions or by glaciers of a pre-historic age. At other places, deep fissures indicated frightful earthquakes, which had rent asunder whole mountain ranges, causing the once abundant seas and lakes to sink out of sight into the moon's interior.

The grandeur of these scenes, originally created in the throes of the moon's death agony, appalled the travelers. Utter desolation depresses the most valiant spirits. They involuntarily drew closer together and kept up a continuous conversation, in order to bolster up their courage.

Finally Copernicus, with its concentric ridges, arose before them. The ascent was slow as the summit towered to a height of nearly 16,000 feet.

Arriving at the top, out of breath and perspiring, they sat down to marvel at the wonderful panorama before them. It seemed fully 50 miles across to the opposite side, and glancing down, they judged the depth to be at least three miles. Rising from the center were

the inner cones clustered like the towers of a Gothic cathedral. The descent was cautious. The explorers were in constant dread of landslides. Enormous deposits of sulphur crystallized into fantastic shapes, spangled the sides, interspersed with masses of iron pyrite. The beauty and wealth of these minerals fascinated them and their amazement was further heightened to see that huge blocks of the sulphur had been cut away by some artificial means. Upon scanning the crater's rim again, a definite groove was discernible, an ancient road by means of which the moon people had hauled away this valuable element to their distant city.

The crater floor, reached at last, was as level as a table and contained centuries of accumulated ash. It was so fine and fluffy they sank into it to their knees. Kenworthy chose that craterlet which still possessed an open mouth and cautiously they gained its crest. They peered into the yawning chasm, trying to pierce the jet blackness.

Scofield leaned over a little further. He had not quite mastered the equilibrium of the stroller under the influence of lunar gravity. He leaned over still further and then—the unexpected happened! The ground gave way in an avalanche of lava and ash. He vanished into utter blackness!

Kenworthy involuntarily yelled "Fred! Fred!" with all his might, but the telephone wires had snapped and no sound could penetrate the void. Horrified, he threw himself on his stomach and gazed long into the crater's mouth. His bitter tears blurred the helmet window. Stupefied, he wondered what to do, when Mueller's signal from the rocket roused him to action. Uncoiling his scaling cable, he attached to the end his electric torch and lowered it nearly 300 feet, fastening the upper end to a big stone. He lingered a few more minutes and then reluctantly made his way back to the rocket. He picked his path carefully, going almost in a straight line. Knowing his lunar geography almost by heart, it was not in his calculations to be lost on the moon.

Mueller's consternation, when he saw Kenworthy returning alone, was unbounded. He paced the floor as the professor recited the harrowing details. He had come to love his pupil like a son and recalled his eager face in the amphitheatre at Boston Tech during his chemistry lectures.

Suddenly he sat down at the transmitter and spoke to Fred, hoping he would be able to hear the message.

"Fred, dear boy, have courage down there. Your air supply should last three more hours. Kenny is returning with a thousand foot cable. I hope you will be able to reach that. God help you to get out the best way you can. If you find the air supply running short, I have a secret to tell you, Fred. It is my theory that down in these craters there are air pockets. Take your cigarette lighter out of that tin box on your tool belt. Just see if you can strike a light. If you can, you are saved. Good-bye, Fred, I must help Kenny now."

In the meantime, what were Scofield's thoughts? He was one of those fortunate individuals gifted with quick thinking and muscular co-ordination. Anything requiring agility suited his nature. He had been a star basketball player, his skill at tennis was marked, he

could walk on his hands and he could pole-vault. Walking on the four-inch flange of an I-beam hundreds of feet above ground never daunted him. Consequently, the instant he felt himself drop, he thrust out his arms and legs and by violently twisting, managed to right himself. He knew the lesser force of gravity on the moon would carry him down at but one-sixth the rate on the earth. If he could just retard the fall once or twice, he felt it would be possible to drop perhaps a thousand feet without getting seriously hurt. Hardly a hundred feet below, the tunnel made the first turn. He hit the side clumsily and started to slide at an incline of 45 degrees. Within another 200 feet, the direction changed. There was a sheer drop for about 50 feet and then the sliding commenced again. This time it was very rough and he knew he was riding on gigantic waves of hardened lava. He thought two or three times that he was going to stop, but continued on and on. The direction changed again and he fell sheer 200 feet more to the bottom. Here the passage changed to lateral and widened considerably.

HE remained sprawled on the bottom for some time, calmly contemplating his position, and little realizing that he had descended nearly 700 feet, 500 feet of which were below the crater floor. He became conscious of silence and blackness—two things that suddenly seemed to stifle him. Mechanically he tried to snap on his electric torch, but the fragile little bulb had broken. It was then that fear seized him—not for himself, but for the two older men who would perish without the aid of his strength and skill to get the rocket back in the firing position.

In the midst of these broodings, Mueller's signal came with startling clearness and the ensuing directions electrified Scofield into action. He immediately pawed with his steel fingers in the tin box and with considerable difficulty extracted the cigarette lighter. He twirled the little wheel and marvelous to relate, it lighted at the first shot, a thing he had never experienced on earth. The flame burned yellow, aiding him to extract a candle from his kit and light it. He placed the candle on a ledge of rock and then looked around to examine his surroundings. The walls reflected back the solitary candle and he realized that they were crystalline. No footing would be possible and Kenworthy would literally have to drag him to the summit.

Well, there would be a way, he thought, while fumbling with the helmet ring. It was now or never. The thing came off with a hiss and he gasped for breath. Light as the atmosphere was, its rich oxygen restored him to normal respiration within a moment. He crawled from the stroller like a butterfly, emerging from its chrysalis into a new world. The first thing Scofield did was to unscrew the back of his torch and try the spare bulb. It flashed brilliantly. He now had a good light.

The great cavern in which he found himself stretched off into the dim distance. He felt an earth tremor and a faint rumble as of a mighty cataract. He thought of Verne's absorbing tale, "A Trip to the Center of the Earth," which he had read three times as a boy.

Tempting as it was to explore this mysterious place,

he was not going to further endanger himself, not only for his own sake, but for the lives of his friends, which were also at stake. He would take a few steps though, to get the kinks out of his legs and back. He advanced perhaps a hundred feet, when the passage was blocked by a pool of water, which was in a state of agitation. Upon touching the water with his finger tips, he found it to be quite warm and it proved to be sulphurous to the taste.

"A hot sulphur bath," he thought. "What a luxury! I would have to pay a pretty penny for this at one of the earth's health resorts." Wherewith he quickly undressed and plunged into the pool. He stayed close to the edge, however, for fear he might be drawn down by internal currents.

CHAPTER VII.

The Rescue

IN the meantime, running and stumbling with a great weight of steel cable, a pick, a shovel, extra oxygen tanks, the professor made his way back to Copernicus with heavy and apprehensive heart. Arriving at the summit, he quickly withdrew the short cable and spliced it to the one he carried. Attaching a powerful electric flood light, he let this down slowly until it disappeared in the bends of the tunnel. The horrible truth dawned upon him. The sides of the crater were smooth as glass and would afford Scofield no footing whatsoever.

He paused, dumfounded, not knowing what to do next.

What was that? Was someone tugging at the cable? Yes, it was being jerked in a curious manner, and then Kenworthy realized that Scofield was signaling to him in code.

"Am alive but very hungry. Please send down a thermos bottle of hot coffee and a dozen of Mueller's liverwurst sandwiches."

"How impossible!" Kenworthy thought. "The stroller must be smashed open and Fred was breathing lunar air!"

"All right, can you live?"

"Yes, yes," came the reply. "I am breathing lunar air. The temp is very warm. Don't worry, I'll be patient until you drag me out."

With light heart and amazement, Kenworthy bounded back to the rocket, where Mueller eagerly awaited him and while he recited the details, he packed several substantial meals in a cold-proof container. This was in due time let down to Scofield, who was delighted to find his pipe and tobacco among the good things. There were, as usual, several of the "damnable specimen bottles" and explicit directions for their filling.

Again Kenworthy returned to the rocket only to find that Mueller was still unable to get in communication with the earth by means of the radio. With Scofield safe for the present, he set about mounting the telescope with which to read the earth signals. When completed, he pulled in the four corners of the silk square, thus forming an octagon, the prearranged sign to show that the explorers were ready for the messages.

Two hours later a black dot was visible in the Pacific; then a series of dots, giving details concerning

the arrival of the supply rocket, the flare of which had been observed. It was a considerable distance to the north and east of the first missile and had landed in the vicinity of the Sinus Iridum.

Excitement on the earth was beyond imagination when Kenworthy's black square appeared in the desert sands. It had been seen simultaneously in a score of observatories. The second rocket was immediately dispatched. It was packed with all sorts of supplies. Since the time of the first rocket's trip was accurately known, the recoil charges of the second rocket were fired electrically at the proper moment.

In spite of the most careful calculations, the shots came too soon and the projectile was buried deeply in the sands. Since it was not necessary to insulate this one from the intense cold, several large hatches were arranged to be easily opened from the outside. Kenworthy managed to open the rear, in order to drag out a third stroller, which he carried back to Mueller.

They set out at once to rescue Scofield. Again they were at the yawning edge of Copernicus. An emergency tank of oxygen was let down and ten minutes later Scofield indicated that he was ready to make the ascent. Straining and heaving, they dragged the iron man up foot by foot. After an hour of exhausting effort, the steel helmet emerged into the sunlight.

And the three moon-strollers set out immediately to unpack the supplies.

CHAPTER VIII.

Preparations for the Return

THEY spread out the contents of the rocket on the sands, and among the first things to be assembled was a light truck, rocket propelled. In this, numerous trips were made back to the home-base, which now began to resemble an engineering encampment.

The method for returning to earth was to set up a light structural steel tripod in which the rocket would be supported in an upright position. Since it was not necessary to give the rocket anything like the starting force, which had been necessary to make it leave the terrestrial influence, they figured that only a third of the cartridges would be necessary for the return journey.

The time passed too quickly; there was so much to do. Kenworthy busied himself with his astronomy. The magnificence of the heavens, as viewed from the moon, was worth the peril of the trip. The planets showed out with singular brilliance and using the reflector, he confirmed Lowell's records of the Martian canals. His photographic proofs at last convinced a sceptical world. The plates revealed that Mars had seen the establishment of communication between the earth and its satellite, for in the center of polar ice of the southern hemisphere appeared a black square which changed to an octagon. This was not known until several weeks later, when the plates were developed in the Chicago laboratories.

Interesting as those details are, we are mainly concerned just now with the safe return of the explorers and their incalculable amount of scientific data and discoveries.

Bolting together the steel tripod was slow work.

Each leg had to be imbedded in solid rock. Steel cables, block and tackle and hand windlass all served to hoist the big metal rocket into place. The lessened weight aided the men materially.

Among the various things the supply rocket contained was another receiver and Mueller was now able to get messages of advice and encouragement from the earth.

Kenworthy and Scofield spent a considerable amount of time each day rolling up and spreading out the square of silk, laconic messages which the world press was hungry to receive. They regretted having to waste so much time, but the rocket did not have facilities adequate to generate sufficient current to broadcast.

America quickly saw the commercial possibilities of this adventure. Pathé News offered the astronomer a million for his films and Associated Press countered by offering another million for Scofield's exclusive story. Mueller, who despised money, would not listen to these attractive overtures. His pride was unbounded, however, when Jena conferred upon him an honorary degree, "In Absente." Fraeulein Mueller, who attended to all money matters, made arrangements with publishers and later banked substantial checks—royalties from his monumental works on the moon's geology.

I spoke of each day on the moon, because it was necessary for the explorers to conform to an earthly day in order to preserve their health and strength. Work at the best was very exhausting. The heart accelerated at the slightest exertion. One was always on duty while the other two slept.

Lower and lower the sun sank while Kenworthy watched the lengthening shadows with growing apprehension. Frantic warnings now came by radio to Mueller, who was too busy to pay much attention.

Eventually the firing chamber was packed with its cartridges, each electrically connected with the central switchboard. The recoil cartridges of triple strength were fitted into the rocket's nose. The travelers packed everything into its allotted space. Nothing was loose, belts and spring catches held all. The telescope, the truck, some tools, the empty supply rocket and tripod were left behind. These mute reminders would cheer and aid the next moon travelers or those who would eventually make a brief stop here in their attempt to reach Mars.

Everything being ready, and the men being utterly exhausted from their unnatural life, they were only too glad to climb into the rocket. The three strollers were stored away, two in their customary niches and the third in the outer chamber. Mueller looked lovingly at his minerals; Scofield regarded the strollers with satisfaction and Kenworthy paged his astronomical notes.

The sun was just above the horizon. The Sea of Tranquility lay in deep shadow and only the distant Apennines remained in sunlight. Our brave adventurers belted themselves down on the air mattress, rocking on its ingenious shock absorbers. Kenworthy noted the time and Scofield pressed the button.

Jules Verne picked the deepest part of the Pacific Ocean as a landing place for his moon projectile, but our earthbound travelers had no choice. They came

down in the Andes mountains, considerably bruised and shocked, in spite of the recoil discharges which brought the rocket almost to a standstill. Fortunately their gyroscopic stabilizer prevented them from rolling down the mountain side or they all would have been killed. It was ten days afterward before they got in touch with the civilized world.

There is little else to tell. It is needless to describe

the international celebrations, the exhibition of the strollers in the principal cities of the world and to tell how the names of Scofield, Kenworthy and Mueller were engraved on the honor rolls of every scientific society as the bravest, the most resourceful and the greatest contributors to scientific knowledge that the world has ever known.

The next voyage into space must be much longer.

THE END.

The Evolutionary Monstrosity

By Clare Winger Harris

A GAIN, our well known author, Mrs. Harris, steps to the front with a gem of a story which proves her versatility as a writer of scientific fiction. What is evolution? and how does it all come about? And how long does it take a race to evolve? All difficult questions to answer in a short paragraph. But there are many who believe that it is possible to speed up evolution. We do it experimentally with the lower animals and insects, and there is no doubt that sooner or later we can do it with human beings. When that time comes, it will be a most interesting adventure for us humans, but we do hope, for the good of humanity, that it will not be along the lines as expressed in the present story.

However, do not forget that dynamite can be used for killing people and for peaceful endeavors as well.

This story is published in the Winter Edition of
AMAZING STORIES QUARTERLY

Now on sale at all newsstands

What the Sodium Lines Revealed

By L. Taylor Hansen

In Collaboration with H. W. EDWARDS, PH.D.

T HIS is a most unusual interplanetary story that certainly does not follow the general path of stories of that kind. The suspense contained in the story is excellent and a slight amount of romance, thrown in for good measure, does not at all detract from the story; rather, it makes you like it better.

But the thing that impresses us most, is the excellent explanation that the author has given for one of the most puzzling questions which every reader and scientist has been asking for years.

If, as we all admit, the supposed Martians have a civilization exceeding ours by hundreds of thousands, if not millions of years, why then, have they not communicated with us? Or why have they not sent space flyers to the earth? The author has given an excellent answer to this—plausible, as well as clever.

This story is published in the Winter Edition of
AMAZING STORIES QUARTERLY

Now on sale at all newsstands

What Do You Know?

R EADERS of AMAZING STORIES have frequently commented upon the fact that there is more actual knowledge to be gained through reading its pages than from many a textbook. Moreover, most of the stories are written in a popular vein, making it possible for any one to grasp important facts.

The questions which we give below are all answered on the pages as listed at the end of the questions. Please see if you can answer the questions without looking for the answer, and see how well you check up on your general knowledge.

1. What ancient classic author is authority for the falling of a meteorite in Thrace? (See page 138.)
2. What is the characteristic composition of many meteorites? (See page 138.)
3. What is the function of the cotyledons or seed leaves of plants? (See page 140.)
4. What would be the relative weight of any object on the moon compared with what it is on the earth? (See page 146.)
5. What is the height of some typical lunar mountains? (See pages 150-152.)
6. Would an explosion produce a sound on the moon? (See page 151.)
7. Can an atom be compared to the planetary system? (See page 157.)
8. Can atomic space, the space within the atom, be compared to interplanetary space? (See page 157.)
9. Can motion produce invisibility? (See page 172.)
10. Why are the rapidly moving particles of solid matter, molecules and atoms visible, not individually, but in the aggregate? (See page 175.)
11. Can you find a theory for the invisibility of gases such as those of the air? (See page 175.)
12. Why are lilies and hair white? (See page 177.)
13. What is a urometer? (See page 111.)
14. What is the effect of rain upon the sea? (See page 114.)
15. What Arctic currents show the existence of the northwest passage? (See page 115.)

The DIABOLICAL DRUG

By Clare Winger Harris

Author of: "The Miracle of the Lily," "The Menace of Mars," etc.

IF Edgar Hamilton had even remotely suspected whither his singular experiments in anaesthetics were destined to lead him, it is doubtful whether he would have undertaken even the initial steps. But the degrees by which he advanced from an astounding scientific discovery to an experience beyond the ordinary ken of mankind, were in themselves so slow and uncertain as to fail to give warning of the ultimate catastrophe.

Young Hamilton's years numbered but twenty-six, and this was to the youth himself a great source of annoyance, for the young woman whom he adored with heart and soul lacked but four months of being thirty-two. Now these six years would not have mattered in the least to Edgar, had they not, in the eyes of his lady-love, represented an unbridgeable gulf. Repeated declarations of a lasting devotion did not change the lady's mind in the slightest degree, so that at last, in utter despair, Edgar shut himself in his little chemical laboratory and applied himself assiduously to the pursuit of the science that he loved.

For two months he saw very little of Ellen Gordan, and even in her presence he had an air of abstraction that contrasted strangely with his former ardor. Upon the rare occasions, when he left his laboratory to call at the Gordan home, he sat with preoccupied gaze, much to Ellen's annoyance, for this indifference was certainly less satisfying than his former demonstrations of affection had been.

Then one October day he was ushered into her presence as she sat playing the piano. He was hatless and breathless. She gazed at him reprovingly, much as a teacher might look in correcting a naughty school-boy. Edgar comprehended the glance, and it only rendered his present call of greater importance to him.

"I say, Ellen, where can I talk to you alone? I've got so much to explain. But we must have privacy."

A smile of amusement flitted across her face.

"Let's go into the library, Edgar. It is warm by the fire-place and no one will intrude."

Together they passed into the library. After the door was closed, he produced from his coat-pocket a vial containing about two ounces of a clear amber-colored liquid, which he held up for her inspection.

"What is it?" she asked wonderingly.

"It's the most wonderful potion ever concocted by the hand of man," he answered somewhat huskily. "It

will make Ponce de Leon's fountain of eternal youth look like poison hooch!"

"But I don't understand, my boy. Is it to be taken internally?"

"No, that would be somewhat risky. This is to be injected into the blood—and—then—" He paused, not knowing how to continue.

"And then—what?" asked Miss Gordan with interested eyes riveted upon the golden fluid.

"I will explain." Hamilton gazed for a long moment at the yellow contents of the small bottle before continuing. Then he spoke, and his voice quivered with the intensity of his emotion. "You know, Ellen, the brain is the conscious center to which vibrations are conveyed by the nerves. Do you know what happens when the brain interprets vibrations?"

Ellen admitted that she did not.

"Well, neither do I," resumed Hamilton, "nor does anybody else, for that matter, but that there is a similar interpretation to all human beings from a given source of vibrations, there can be no doubt, though it can not be proved that we respond identically. These various vibrations, whether they are the rapid ones of sight, the slower ones of sound, or the still slower ones of

touch, must travel over a nerve with something like pressure, which vibrations, as I said before, are probably similarly interpreted by all of us. Now here comes my wonderful discovery," Edgar Hamilton's eyes gleamed with enthusiasm as he reached his climax. "I have discovered that this pressure, which travels along the nerves to the

brain, is very like volts in electricity. Now must anaesthetics deaden the nerves so that they but faintly convey the nervous impulses to the brain, but I have here a drug that instead of deadening the nerves, reduces the pressure or voltage, not in halves, mind you, but in hundredths and even in thousandths. You know how our bodies grow old. What is life but the sum total of our forces that resist death? Decrease the nervous energy expended in this process of warding off the grim reaper, and you have a prolongation of the bodily functions. Hence if not eternal, at least a protracted youth."

He held for her further inspection the bit of glass with its amber contents.

"Will—will it—make me younger?" she faltered.

"Certainly not," he replied. "It will merely retard

MUCH has been said about the preservation and lengthening of life. Many ideas were promulgated and many methods were suggested, but it remained for Mrs. Harris to suggest an entirely new and unique plan of procedure. Why might not an electrical treatment be discovered sometime that could retard action to such an extent as to prolong life—or perhaps speed it up an equal amount to shorten life. There seems to be no very good reason for it and the author, in her own characteristic manner, produces a story of unusual interest around this possibility.



After a dazed second or two, Edgar thought the cat had disappeared, but upon closer observation, he perceived a faint gray streak moving with almost lightning-like rapidity around the room.

the expenditure of your energy, and you will age very slowly, while the rest of us can overtake and pass you on life's journey. In other words, you will remain about thirty-two, while I go ahead at life's customary pace, catch up and pass you by a year or two, and then—then, Ellen, I may find favor in your eyes!"

"Oh, Edgar, if that can be done I shall truly say yes. What a wonderful man you are to have figured out so marvelous a plan!"

EDGAR HAMILTON already fancied that the future held much happiness for them both.

"And you are not afraid to have me inject this drug into your arm?" he asked.

"Is it painless?" she questioned.

"To the best of my knowledge, yes," he answered gravely.

"Very well, then I am ready." She pulled up the sleeve which covered her left arm, while Edgar filled the needle with some of the liquid from the little glass vessel.

"It will require the entire amount," he said, "to produce enough change in nervous pressure to keep your body hovering around thirty-two years of age for seven or eight years to come, but I shall administer it slowly."

And administer it he did!

For a moment it seemed that she was going to faint. Edgar led her gently to the massive arm-chair into which she sank. She sat erect, but apparently inanimate. Her eyes stared unshrinking into the flames, then for a period of a minute or two they remained closed. Then Edgar noticed that she was turning her head toward him, but the movement was scarcely perceptible. Her lips were opening so slowly, and from her throat there issued occasional low rumbles.

"My God," cried the terrified young man, "I've done it now! This is awful! Ellen, Ellen, you can not live at this slow rate for seven years. I never realized it could be so gruesome. For heaven's sake stop looking at me so fixedly with your mouth open!! I can't even talk with you intelligibly. Wait—I have it!"

He went to a writing-desk which stood in a corner and took therefrom a large tablet of paper, and producing a pencil from his own pocket, placed them in Ellen Gordan's lap. After what seemed an interminable length of time she apparently noticed the tablet and pencil. Another five, ten and fifteen minutes ticked away on the mahogany mantel-clock, at the end of which time she had the pencil and tablet in hands and was beginning to write.

Edgar knew that task would require at least a half hour, so he left the library and rushed out upon the terrace where he found Mrs. Gordan, an aristocratic appearing woman of fifty-five. To her he poured out the experience of the last few moments. The two lost no time in returning to the library, where Ellen sat, an impassive figure, with a pencil poised apparently motionless above the paper.

"She has written some," cried Edgar, "but we will wait until she is through and then read the whole message."

Poor Mrs. Gordan was overwhelmed at her daughter's catastrophe and did not hesitate to express her

opinion of young Hamilton, in very derogatory epithets. "If you two wanted to be the same age, why didn't you take something to speed you up instead of bringing this calamity upon my poor, dear Ellen?" lamented the distraught mother.

"By George," cried Edgar, "I never thought of that! I believe it would be harder to do, but maybe I can yet, and then I shall catch up with her quickly. I could use it as an antidote for what has been given her."

"Well, try it on yourself first, you rash young man! Better have her this way than dead. But look," she cried, pointing to the immobile figure of her daughter, "she is through writing and is looking toward us with the tablet in her hands."

Edgar seized the message with trembling hands and read it aloud to the anguished mother.

The note ran as follows:

"Edgar, what on earth has happened? I don't feel any different, but you fly around worse than a chicken with its head cut off. Half the time you are a mere streak, and as for your talk, occasionally I hear a fine, piping, whistling note. I see mother is here now but it was quite awhile before she stood in one place long enough for me to make her out. Don't worry, I feel fine, but what ails you?"

After reading this, Edgar sat down at the desk and wrote the following to his sweetheart.

"My own dear Ellen: The amber potion is working! Rates of vibration are relative. If we seem fast to you, you are extremely slow to us. We remain normal with the rest of the inhabitants of this world, while you are considerably slowed up, but do not be alarmed, my dear. I am now beginning to catch up with you in age. And here is a secret for you, your mother and me. I am going to produce an antidote which I shall take until I overtake you quickly, then I shall give you some to bring you back to normal. Then, as the fairy-tale has it, we shall live happily ever after.

Your devoted Edgar.

P. S. You might begin writing me another message right away, so I shall have it to enjoy this evening!"

He gave this note to Ellen and then followed Mrs. Gordan out on the terrace, where he assured her with sincere words of consolation, that everything would come out all right. Mrs. Gordan had been considerably cheered by her daughter's message, and the indignation which she had felt toward her prospective son-in-law was partially mollified. They sat for some time discussing the prospects of a bright future. At length Edgar arose and said he would have a look in at the library to see if Ellen had finished reading the note. In a moment he rushed back toward Mrs. Gordan, his face depicting abject terror.

"Come, come at once," he cried.

The frantic mother joined him, and together they ran into the library.

Ellen sat with her face turned toward them, her

mouth wide open, her eyes squinting. The immobility of the features was gruesome.

"Isn't that awful!" gasped Edgar when he could find voice.

"Awful, nothing!" exclaimed the indignant mother. "Can't you see the poor dear girl is laughing at your post-script? See, her finger points to it!"

But Edgar turned and fled!

MANY times in the days and weeks that followed, Edgar Hamilton thought of the interminable smile that had lost its quality of alert gaiety, which is essential, if a smile is to put across its meaning at all.

And the antidote? That was progressing splendidly. It was to be a much more powerful drug than the other. Edgar had figured out that one drop of the colorless antidote would counteract the two ounces of amber fluid which had been injected into the veins of Ellen Gordan.

Before taking any chances with himself, Edgar decided to try the experiment upon Napoleon, the tortoiseshell cat. Napoleon had been nicknamed Nap because he was such a sleepy old fellow. Nap was past the prime of cat life. He was no longer a good mouser, so Edgar figured that if his declining years were a bit shortened, no one would greatly regret that fact, and Nap could prove very useful in testing the powerful antidote.

Nap was discovered sleeping under the back porch near the remains of a pork chop which Agnes, the maid, had thrown out to him after breakfast. Edgar smuggled the furry creature upstairs and into the laboratory, and lost no time in administering the drug. One drop was all that he intended to inject, but when Nap felt the prick of the needle, he leaped wildly into the air, and before Edgar could withdraw the instrument, Nap had in his veins about ten drops. After a dazed second or two, Edgar thought the cat had disappeared, but upon closer observation, he perceived a faint gray streak near the floor moving with almost lightning-like rapidity around the room. Finally the streak disappeared and he saw flashes of color. These, he assumed, were the vibrations of Nap's wild cries increased until they entered the realm of vision. Then there was a puff of smoke, an instantaneous glare of fire, and Edgar knew that Nap had literally ignited, due to his friction with the air.

"Well," thought the young chemist sadly, when he had recovered from the shock of Nap's fate, "I must take only one drop. That will allow me to catch up with Ellen in a few weeks, or at most, months. Then we will forget about this dangerous drug business."

He took within the needle but one drop of the crystal fluid and injected it quickly. Nothing apparently happened. He walked to his window and looked out upon the street below, and then he knew what had occurred. It was a frozen world that he beheld! An automobile stood in front of the house and yet it was not standing, for behind it was a cloud of dust that hung motionless like a fog-bank. Everywhere people stood in grotesque attitudes. It required the most infinite patience to discover the meaning of their postures. He turned away from the window and stood buried in thought. At last he became aware that Agnes, the maid, was drifting

toward him like some slowly swimming fish. She held a letter in her hand.

"Now," thought Edgar, "I will not alarm her. I will imitate her slow and ponderous movements in receiving the letter from her."

Gauging the rate of her approach, he extended his arm as slowly as his muscular control permitted and received the letter with a grave and tiresomely slow bow. If his actions did not appear exactly normal, he could not tell it by the fixed expression of Agnes' features, which were none too mobile under ordinary conditions. He stood perfectly still until she had disappeared, then with feverish haste he opened the missive which was written in the straight firm handwriting of Mr. Paul Gordan, the father of Ellen.

"You infernal young idiot," it ran, "I'd like nothing so well as to twist your miserable neck! Day after day my daughter sits like a statue and it quite gets on her mother's nerves and mine, to get into communication with her. But now to cap the climax! She has a severe case of measles and the doctor tells us she will likely have the disease for the next five years!"

With a sob, Edgar flung the letter from him and seized the vial of colorless liquid.

"Let it be ten drops," he said hoarsely. "I shall go as old Nap did—but no—I shan't prolong it, I will take the entire two ounces that I have made. The quicker the better!"

NOW the reader at this point will doubtless be prepared for the hasty conclusion of this story, but such, I regret to say, is not the case. Have you never heard that one hundred thousand volts of high frequency electricity can be discharged through a living body with no apparent damage, but diminish the number of volts to five hundred or a thousand at a lower frequency and death is instantaneous? Something of the quality of the mysterious force known to us as electricity was contained in that harmless looking liquid. Before Edgar had put the entire two ounces into his arm he was conscious of a deafening roar and of intermittent flashes of brilliant lights. He felt as if he were falling through interstellar space. He seemed to be passing suns with planets swinging in their orbits about them. Great universes stretched on and on without end! At first he thought, "They are universes of solar systems, containing suns and planets." Then with sudden lucidity came the thought, "They are molecules made up of atoms, containing protons and electrons! I am going, not the way of the telescope, but of the microscope!"

A physics professor, who had been considered a little wild in his theories, had once said these words and they had never been forgotten by the student, Hamilton.

"Our Earth in the ether of space is as but a grain of sand upon the sea-shore. Our universes may be but a molecule in a greater universe, and all our ages since the beginning of our time, records but a second in the time of that larger cosmos. Then take it the other way too. In this grain of sand which I hold in my hand, there may be other universes which, while I have talked to you, have come into being, and van-

ished. Students, perhaps time is the fourth dimension we have sought after so long!! Would not this theory prove that the time element enters into the size of things?"

Then Edgar understood. Ellen had been headed the way of the telescope, but *only to an infinitesimal degree*. His body was hurtling *millions of times more rapidly* in the direction of microscopic infinity, and as his physics professor had explained, the atomic space is as vast, proportionally, as interplanetary space. The difference is that of rates of vibration, and with his bodily shrinkage, Edgar was expending his bodily energies at a relatively rapid rate.

Unable to measure the passage of time, Edgar drowsily felt himself losing consciousness. If this was death it was actually a pleasurable experience.

AGAIN consciousness, sharp and acute. Edgar looked about him and raised himself to a sitting posture. In his ears pounded an almost deafening roar, and a strong wind was blowing steadily. He seemed to be lying upon a stone-paved floor. Then he observed that it was a great ledge, as broad as the length of a city block. He could see where it made a straight horizon with the sky a few rods away. But the fearful roar! He turned toward the near edge of this ledge, and there, stretching in endless billows that tossed and drove great waves to points within not more than ten feet from the top of the huge wall, was a vast watery expanse, the most restless, writhing body of water that Edgar had ever imagined. Nothing but water, a deep blue sky (not the cerulean blue of the skies of Terra, but a deeper royal blue) and the stone paving of this vast shelf of rocks! Edgar took a few steps toward the farther edge. As he walked, he noticed how evenly and smoothly the slabs of stone had been fitted together. It was like one vast block of concrete.

He approached curiously and cautiously the opposite edge, and peered below. He drew back in even greater alarm, for he had glimpsed a pit of fire that sent up great tongues of flame. He seemed literally between the devil and the deep sea! Stepping back a few paces he commenced to walk along the paving which seemed the only safe place upon this strange world. To the left stretched the boundless sea and to the right the awful semblance of Hades!

After several miles of weary walking, Edgar began to feel acutely the pangs of hunger. He ventured warily toward the right edge once more, and this time he did not draw back in alarm. Far, far below him lay a beautiful green valley with rolling swards and mossy hillocks. Dwelling-places dotted the landscape and figures moved about. From his lofty height the scene resembled the miniature card-board village of his childhood's day. But how to descend into this Garden of Eden! There seemed to be no visible means of getting down to what seemed a veritable paradise, after the experiences of the past hour. Along the entire length of the wall, as far down as Edgar could see, in both directions, his eye could perceive nothing but a blank uniformity, unless—he peered more intently. A few feet directly below him he saw two small holes,

and his heart gave a joyful bound. The holes must have been made there for the purpose of attaching the curved ends of a ladder used in ascending this most gigantic piece of masonry. Edgar decided to remain directly above the holes until one of the inhabitants of this miniature world should be moved by providence to investigate the top of the mammoth dike.

Many times during the days that followed, Edgar gave up in despair. He tried to shout, but his voice was completely lost in the unceasing roar of the ocean back of him. Too weak to hope longer, he lay down utterly despondent. And then came hope and with it a renewed strength!

Directly below him at the base of this vast wall which sloped toward the valley, at an angle of about thirty degrees, were many figures gesticulating and carrying long black objects upon their shoulders. Edgar in his weakness and excitement nearly lost his balance in watching the procedure. Then he was assured beyond the question of a doubt that one of them was scaling the wall. Over and over the ladder was being turned and attached into holes along the side. Nearer and nearer crawled a tiny saffron garmented creature until the ladder had been inserted into the last holes and an inhabitant of the remote valley stood in astonishment before Edgar Hamilton.

His short yellow garment hung by straps across his shoulders and extended below his waist where it ended in short bloomers, full enough to give the effect of a skirt. His features were in type not unlike those of the people of our eastern civilization of today.

Communication through a common language was, of course, impossible, but Edgar was able to indicate his desire for food and his wish to descend into the green valley. The stranger nodded and then ran to the opposite edge of the dike and gazed long and fixedly at the stormy sea. At length he turned back toward Edgar and the latter noticed that his face wore an expression of extreme anxiety.

They both descended by the ladder.

Once down among these people, so like and yet so different from himself, Hamilton learned many strange and wonderful things. Inside of a few weeks he had mastered their language. He became acquainted with numerous astounding truths concerning this planet to which fate had so strangely sent him. Chief among these was the fact that the large island upon which the people dwelt had at one time been part of a vast continent, but the larger portion of this land with its great cities and monumental temples, palaces and fertile plains had been swallowed up in the ocean. The remnant of the civilization living upon a lofty plateau had managed to survive the onslaught of the sea, whose waters seemed to creep up through the centuries, and threatened to engulf them. In reality it was not the water which rose, but the land that sank due to enormous subterranean gas pockets collapsing, the gas escaping through fiery volcanoes. This was a sunken land then that maintained its temporary safety only through the building and repair of its monstrous dikes.

Edgar thought of Holland on the far away Earth. (Ah! but was it so far away? He and all the universe about him were an infinitesimal part of the new blue-

figured linoleum that he had purchased recently for his laboratory!)

"Not so much like Holland," he said to himself one time, "as like the lost land of Mu, which, according to archeologists was a tropical continent larger than North America. It went to the bottom of the Pacific with its sixty-four million white inhabitants and their templed cities thirteen thousand years ago."

Then *she* came into Edgar's life and gradually he forgot the linoleum on the laboratory floor and the measles that threatened to last for five long years. *She* was the daughter of Elto, the chief inspector and engineer of the dikes. A sort of modern Nehemiah was he, as he superintended the continual erection of the rocky walls that preserved the land of Luntin from total annihilation. Her name was Yana and her pale, wild beauty outrivalled the charms of any earthly maiden Edgar had ever known.

One time they sat upon a grassy knoll outside Elto's home. They looked in the direction of Mt. Karp. into whose forbidding depths Edgar had gazed at the time of his arrival upon this planet.

"The fiery mount has been very active of late years," said Yana sadly, her sweet troubled eyes turned in the direction of the volcano. "Father says that the land is sinking rapidly and that the dikes have now been built as high as is possible without their crumbling. He and the wise Kermis predict that inside of the next fifty or sixty years our beloved Luntin and its inhabitants will be no more, and over all this will stretch that wild, roaring ocean!"

She shuddered and in that moment Edgar had clasped her in his arms and won from her the promise to be his bride.

TWENTY-FIVE years passed; years filled with much happiness, but clouded with an ever increasing anxiety for the fate of Luntin. Edgar and Yana had lived in happy companionship. They had a son whom they called Yangar. The lad was the pride of their hearts. He had inherited his grandfather's constructive ability, and at the age of twenty-two was appointed chief engineer of the dikes, to succeed his late grandfather, Elto. In this capacity Yangar was a decided success, and by his ingenuity had more than once warded off dire calamity to his country.

THIRTY-FIVE years more! It looked as if the date set by old Elto for the inundation was nigh. Yangar, now a widower with a son of his own, Manly, was ingenious and vigilant, but even these qualities could not hold out forever against such a monster as hurled itself constantly against the walls. Yana grew thin and wasted away with worry and died. Edgar sorrowed greatly over the loss of his wife, and his son became doubly dear to him.

One time after Yangar had returned from an inspection of the dikes, his father showed him a bottle containing a yellow liquid.

"This," he explained to Yangar, "is the way out of the catastrophe for us. It has taken me years to prepare it. I will divide it in thirds; for you, Manly, and myself. It is a very concentrated form of a drug

I prepared sixty years ago. The entire contents of this bottle is sufficient, if injected into the veins of you, Manly and myself, to so decrease the rate of our nerve impulses that we shall no longer be of this world."

He paused, while in retrospection his mind's eye saw the immobile form of that earthly maiden with her interminable smile.

"We shall not be of this world, father!" exclaimed Yangar. "Do you mean that we shall die?"

"Not that, I trust," replied Edgar, "but as I have often explained to you before, time and size being purely relative, we cannot of necessity become infinitely slower in our rate of existence without at the same time growing infinitely bigger. This process employed at the crucial moment of disaster will lift us to a world in a universe next larger to our own. My bodily forces are about exhausted anyhow, but for you and your son Manly, it will mean the ability to complete the normal span of your lives."

Then came a day when Edgar and his grandson, Manly, a young man of four and thirty, who bore a marked resemblance to his grandfather when the latter had come a stranger to Luntin, sat within the little stone house where they and Yangar dwelt together. The latter was away, as was his custom, to oversee work upon the dikes. On the morrow Manly would be one of the number chosen to labor for the safety of his land.

"To-morrow you and Yangar must take with you your bottles containing your portions of this wonderful drug that diminishes nervous pressure," said Edgar Hamilton, smiling with affection at his stalwart and handsome grandson. "It is no longer safe to be without it. The attached syringes will render its injection a matter of seconds only."

He had scarcely finished speaking when a roar like thunder shook the very ground beneath their feet. Together they rushed to the entrance and lifted their eyes to the rocky wall that had held at bay their watery enemy for so many generations. The dike was a crumbling mass, a Niagara, increased to many times its earthly proportions.

MAY the saints preserve me!" exclaimed Agnes as she flew toward her room and locked the door. "This mornin' I hands a note to master Edgar and he acts that queer I think he's after losin' his mind. Then this evenin' I goes in, and there he's a settin' on the floor with next to nothin' on, and an old man standin' beside him! I'm through. If these goin's on don't stop, I'm after lookin' for another job!"

AT nine o'clock that evening the door-bell rang at the Gordan residence.

"The strange doctor who was called for consultation by Dr. Bennett, dear," said Mrs. Gordan to her husband. "Dr. Bennett said he would send him to see poor Ellen. Will you go to the door?"

"If it's the doctor, all right," responded her spouse, "but should it chance to be that scalawag, Hamilton, down the front steps he goes faster than he came up!"

Mr. Gordan opened the front door and gave a little

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The POSTERITY FUND

By Raymond Emery Lawrence



He was a liar—a shameless one. Not only in Smithville but in Jonesboro and Martinsdale as well. There were at least half a dozen reputable persons from the last two places who so testified.

Doubtless he had falsified in many other places, farther away than Martinsdale and Jonesboro; it was certain that he could not have become so scornful of truth all at once.

Take his travels. He said he had been all over the world! This was a lie on the face of it. No man could have been all over the world; a man's lifetime wasn't long enough. Hedras Hineberg, who owned an old book, and who could read and write and figure, held that it would take a man two years to walk around the earth; and if he went to all the different parts of the earth this liar told of having been in, it would have taken him several lifetimes.

And the fellow had claimed: "It *did* take me several lifetimes!"

He professed not only to have lived several lifetimes but to have lived in the era of the so-called civilization. Thus did he maunder. That was not all, however; there was a still more outrageous statement which he invariably made, every chance he got. Now everybody knows, or should know, if he listened to the truth from his father, who got it from his father, and so on down to the first of the Chosen—everybody knows that Civilization, the era of the Wicked, was brought to a close by the Angry One. He struck all down—all but a selected few. It happened, as Hedras Hineburg could calculate for you, some four hundred years ago. Mankind was in its heyday of thoughtlessness; the fair face of the earth was cluttered with audacious buildings together with billions of advertising sign-boards that were an affront to good peoples' eyes; the very air was profaned, clouds of roaring, man-made insects thronged it; life was a frightful, jostling thing; righteous ideals were forgotten. Then had the Angry One struck. That was the way of it. But this liar held that it was otherwise. Professing to have been there, he claimed that the Angry One did not strike.

Such a person should be run out of the village. But then, who believed his stories? He was old—insane.

SYLVESTER KRANTOS was extremely old, there was no gainsaying that. His skin was dark with

the weatherbeat of unguessable years and wrinkled beyond description. It hung in loose folds from the bony protuberances of his face, seeming more like an ill-fitting, leathery garb pulled out of shape by countless other persons, ere becoming finally his own personal possession. He was nearly toothless; but his teeth seemed to have disappeared through wear rather than decay, for observation revealed a white line of dentures even with the edges of his gums, a peculiar formation in that these remnants of teeth appeared sound and healthy. His eyes glowed with a fierce intensity, his movements were quick, his voice crisp; he seemed to give the lie to his ancient-appearing skin, making it look all the more like a mere bit of clothing.

His clothing, that which covered the strange leathery fabric that must of necessity have been skin, was of the ordinary sort which everyone wore—the loose coat and trousers; the dogskin cap; the high buskins, broad leather belt. Only on Meditation Day, the day set aside for quiet thought over the destruction of the earth's peoples, did he differ in garb from the rest—on this day he continued to wear the leather belt instead of substituting for it the orthodox black sash.

He had come to Smithville a month before—appearing at the gate to the walled cluster of mud-chinked, field-stone huts, with a fierce-looking dog, half-wolf, at his heels. To-day, shunned by mature minds because of his extravagant tales, and leaving, he was being seen on his way by a pair of village children, a boy and a girl with a penchant for wild tales and with an interest, therefore, in the stranger and his unbelievable story.

The boy was perhaps fourteen, the girl a year or two younger. Both were barefooted; the boy carried a bow and a quiver of arrows. Sunburned, the pair were dark-skinned as the Indians of antiquity; the black hair of both added to the savage effect.

The path which they followed was flanked with alders, the ground carpeted thickly with red and brown leaves and sun-splashed in spots where the green and yellow canopy overhead broke to the blue autumn sky. Once the boy halted and sped an arrow among the gray boles, a rabbit scampering away unharmed, the girl jeering. The boy retaliated a moment later by roughly jerking from the girl's hair a garland of bright red leaves which she had just finished entwining among her black locks.

For a minute there was a rough and tumble combat which the old man terminated by pulling the two apart

STORIES of the far distant future are generally very interesting and always compel our attention.

The present story has impressed us as a most excellent one, and the treatment is as ingenious as it is clear.

Many readers have written in to AMAZING STORIES upon the subject of our present money system and what the future holds for this system. The present story gives an excellent possibility of this phase of evolution.



I leaped toward the instrument, my hand outstretched to turn it off. Just as I had almost reached it, a body hurled itself upon me and I was hurled to the floor. As I struggled about so that I faced him, I saw that he was indeed insane.

with unexpected vigor. Hostilities ended in a diminishing series of bickerings. Meanwhile the trio, the old man in the lead, came out upon a grassy knoll overlooking a broad expanse of river hundreds of feet below. Here and there a small wooded island rose like an emerald out of the satiny white surface. High cliffs, rock spires and battlements rose on either side. The atmosphere in the distant reaches blended with land and water in a soft maze of color—mauves and purples and delicate blues.

"The Columbia is peaceful today," voiced the old man, his eyes burning with a strange fire and seeming to look beyond the atmospheric screen of color. "More peaceful than it once was—"

"How long ago was that?" asked the boy, winking significantly at the girl.

"Over four hundred years ago," replied the old man calmly.

"And you were here, seeing all the strange things the Civilized Ones had?" asked the girl.

The old man nodded.

"But you couldn't have been, when it was over four hundred years ago!" came objection and another wink.

The old man shrugged wearily. "It is the same with you as with your elders. You cannot understand. You are all barbarians. But perhaps you will listen; perhaps you will listen more patiently than your elders have. Do you think if I explain carefully to you about my age you could listen?"

Boy and girl sat down attentively on the grass, the imps of mischief subdued partially by curiosity. After all, might not this old man who spoke so glibly of the past be some sort of a supernatural being! It might be a good plan to listen to him!

"WHEN I was Eugene Mott—"

"What foolishness is this?" exclaimed the boy petulantly.

"I have lived many lifetimes—as I have told your too ignorant fathers—" stated the old man wearily. "With each lifetime I took a different name. I was once Eugene Mott; I have been Thomas Smith; once for fifty years I was known as Ogilvy Henderson; in the latter part of the twentieth century when civilization ran for a spell to standardization I was X3X477. I didn't like that designation; it was overdoing things, I felt.

"But to come back; when I was Eugene Mott, which was during my first existence and in the first half of the twentieth century, a great movement started toward prolongation of life. Doctors—"

"Like Zenus Thompson who boils up herbs in a big kettle?" put in the boy.

The old man smiled from behind the skin folds of his face. "Doctors, unbelievably learned, began doing things to the human body that renewed its youth. In the middle of the twentieth century I was eighty-seven years old; my youth was then renewed, and time after time following that. In the twenty-second century—just before the Great Destruction, which occurred in twenty-one-thirty—I had been renewed seven times—"

"But Hedras Hineberg's book says nothing about

such things and he would have told us!" objected the boy. "It tells nothing about old men becoming young again. Were there many who grew young?"

"A great many," replied the old man, "and Hineberg's book, or any number of books, would fail to tell of it; for by the time the practice had become perfected, books had gone out of existence. In nineteen-eighty-six all printed matter was practically out of date; literature of all kinds was dictated to and reproduced from phonographic records housed in a huge central building and accessible by means of radio. Every person carried a pocket instrument designed specially for communication with the great central library. A movable pointer on a dial connected him instantly with whatever department he wished; by voicing the particular subject or title desired, he was automatically put in touch with the record or the part of the record containing it. This was much better than having to dig knowledge or entertainment from bulky printed pages; though of course, when civilization was destroyed, the knowledge became unavailable. The library system could not function without the aid of many mechanisms, all of which were too complex to be understood by barbarians like you and your fathers.

"The books say nothing—but here is what happened: Thousands of persons, millions finally, had their youth renewed. And then, just when it seemed that death had become a thing of the past, it once more came into its own. The people themselves brought death back. With the usual number of births and no deaths, famine began threatening the human race. Worse than that, civilization began to stagnate, progress showed signs of coming to a standstill. When your father, who is Headman, dies, you or some other will become Headman. Should your father live forever, no one would become Headman. So it was with those people of whom I am telling; the naturally young men had no chance in anything. They had but one advantage over the old ones—they possessed the originality of youth; in one short month, virtually the whole structure of youth renewal was obliterated; the naturally young men rose up and killed not only the old men but the doctors who specialized in renewing youth.

"A handful escaped, a few doctors, a few patients. For months I was in hiding; when the anger of the young blew over, I came out and was allowed to live. The doctors who escaped were also allowed to live, but dared no more practice their professions, except secretly. A few like myself continued to take secret treatments until the Great Destruction. The numerous youth renewals I received seemed to have produced in me an abnormal resistance to death, continuing these hundreds of years since the last treatment. There may be scientific explanations for this—but you would hardly be able to understand them. It is sufficient to conclude that my nearly three hundred years up to the Great Destruction had toughened my organs in some way, adapted me the better to withstand the enemies of life; the three centuries had perhaps produced changes in me that made me an entirely different creature, a logically long-lived creature—"

"And how did you escape the Great Destruction?"

prompted the boy. Both he and the girl had ceased to wink derisively. Though the village had heard the story, these two desired to hear it again. "What caused the Great Destruction?"

"THE twentieth century," began the old man, "might well have been called the century of fads. Especially was this true of the first half of the century. Overnight some new thing would spring up, and by morning, be embraced by the entire world. Thus, among the more frivolous things, we had endurance-dancing, bobbed hair, beauty contests, Ma Jongg—a sort of game; flapperism—a disrespectful attitude affected by young women towards proper conduct; the quoting of silly words, as, 'Yes, we have no bananas'; the chanting of health formulas, as, 'Every day in every way I'm getting better and better'—I could tell you no end of things like this that were taken up impulsively by millions of persons. In this way started the Posterity Fund craze.

"It was an old idea, but not until nineteen-thirty-nine did it seize upon public attention strongly. Then, almost overnight, the interest of the entire world was centered upon Posterity Funds. A small city (Hedras Hineberg has told you of these human beehives) started a fund, its prominent business men depositing a thousand dollars in a local bank, this sum to be added to from time to time and to draw interest for two hundred years. The fund, which at the end of that period would have amounted to a minimum of one hundred million dollars, could then be drawn upon and used by the people for new public buildings or for whatever other purpose they desired. The whole thing was an advertising scheme on the part of the business men, calling attention to themselves and the bank; but quickly the idea seized upon the sentiment of people and spread. Within the year practically every city and town, large or small, had started a posterity fund, and, in practically every case, the time of maturity for the fund was set at two hundred years.

"They were an eventful two centuries!" The old man's eyes became meditative; in some time-annihilative vision he seemed for a moment to forget his listeners. "They were the final up-surge, the glorious last spurt of civilization; all of man's thousands of years of efforts were capped in a way beyond belief in those years. And then to have it all smashed—Yet, perhaps it was well after all. Civilization had advanced too fast for men's nervous systems. True progress occurs by a series of waves; a thousand years from now your children will have reached greater heights of achievement—with more adaptable nervous systems; you will therefore hang on longer than we did, before the crash comes. You are understanding all of this?"

The boy shook his head doubtfully, then spoke: "We understand it *some*; Hedras Hineberg has read lots of things to us from his book—that helps us understand!"

"Yes," nodded the old man, "the book helps. A poor enough work—an encyclopaedia in one volume and printed in nineteen hundred and twenty-two at

that!—but better than nothing. Many things occurred in those two centuries—many spectacular things: Man ceased almost entirely to walk. His automobiles carried him from place to place faster than a mile a minute; this became too slow, and he resorted to airplanes, airplanes that traveled several times as fast. Airplanes became projectiles; the projectiles instead of being driven by propellers and motors became ray-driven. Atomic energy was released and put under control; in the form of rays it was the propelling power of all things.

"Every person owned an aerocar. Morning and evening aerocars filled the skies like a swarm of bees, carrying humans to work or homeward at the rate of two thousand miles an hour. Men lived in Europe and worked in America. American farmers took in the *Folies Bergères*—an old time theatre in Paris—one night, and the next enjoyed a swim off the beach of some island in the Pacific Ocean. Some people no longer lived in houses on the ground, but occupied palatial cars which sped around the earth at a set speed of about a thousand miles an hour, from east to west, thus offsetting the earth's rotation and allowing them to live in a perpetual daytime or night-time, whichever they wished.

"But enough of this. Except for a growing nervousness, an inordinate amount of insanity, the people were quite a bit like the people of today, working, quarreling, spending their money or saving it. Only, unlike your people with their little pieces of gold, these other people rarely saw the money they spent or saved. Nearly everything was done by check, as doubtless Hedras Hineberg has explained to you. The most eventful thing, and the least spectacular, was the coming due of the Posterity Funds.

"I WAS employed in the International Bank, which occupied a gigantic building surrounded by miles of solid green lawn—the most beautiful structure and grounds perhaps in the entire world. And well it should be, considering the wealth behind it, for it was really a consolidation of many banks, thousands of banking institutions originally located all over the globe. Certain methods of handling money—methods that you would not understand—together with developments in radio, had made it possible to have fewer and larger banks instead of having many small ones scattered about for easy access; it was never necessary for people to appear at the bank, at least in person. I was Chief Teller. One morning early President Carlos Hender-shot called me into his private office. It was the first time I had been called in; so systemized was our organization, so competent the specialists in each department, that everything worked like a perfect machine, creating very little need for conversation between the President and his subordinates. Not only had I never before been in the President's private office, but I had rarely seen the President. He lived in a realm apart from the rest of us, arriving and departing in his giant aerocar by a private entrance to the great building. He was in reality a stranger, such a stranger as one might see once in ten or fifteen years, and then for only a

moment and at a distance. So systematized was life.

"He asked me to sit down. As I dazedly complied, I found opportunity to observe him closely for the first time, seeing a man of about sixty, with a broad, sloping brow, an excessively wide face, a beaked nose and a prominent jaw. A typical executive, thought I. A fitting head to our colossal establishment! Then I noted his eyes, finding in them a peculiar light such as I have seen in the mentally unbalanced. His movements, as he motioned me to a chair, were extremely nervous—in keeping with his eyes. He seemed to radiate tenseness. In a moment however I thought no more of his peculiarities; after all, his tenseness was something frequently seen in other men of great responsibilities. Two hundred years before, he would have been deemed on the verge of a breakdown and advised to rest for his health; in the twenty-second century, however, he and others like him kept themselves going by the use of drugs.

"Mott, I want you to listen to this!" he said, and handed me a radio receiver, a special one supplied by the *Universal Times* to subscribers.

"When I had put it to my ear he made an adjustment on the subject dial and I found myself hearing an item of municipal news from a small city in California. The people of this city were contemplating the erection of a new City Hall, to cost fifty million dollars, and to be paid for out of their Posterity Fund, maturing twelve months hence. I looked at President Hendershot questioningly.

"That city may be one of few intending to draw—at least draw heavily—on their Posterity Funds, practically all of which fall due within the year," said Hendershot. "Again, the action of this city, small though it is, may start all cities to planning new public buildings and the withdrawal of enormous sums from their funds. Should such a thing occur, it may mean the end of the International!"

"I was stunned. 'But how can that be?' I remember saying. 'Every dollar on our accounts is more than covered by our assets; nearly every loan is secured by the most dependable security in the world—land!'"

"The President grunted. 'Evidently you are not a close follower of the topics of the day. I myself am not as close a follower of current topics as I should be, or this thing, which I fear, might have been avoided. You have heard of the new food?'"

"The synthetic food?" I asked.

"The President nodded, 'When Christopher Scott announced to the world two years ago his ability to produce food artificially, no one took his statement seriously. Humorists made much fun over the idea, you remember. Inside of a month the thing was forgotten. But a week ago Daniel Steele, champion golfer of the world, mentioned to press agents that he had been training on Scott's synthetic food, and liked it! You know what that means?'"

"A wave of enthusiasm for the new food!" I replied.

"Inside of a month the entire world will have tried the new food," said Hendershot. "And it will be liked! I have tasted it myself and find it exceedingly palatable.

The world will take to it, and will stay with it; land will be practically worthless. I have spoken with Scott. He makes the food not alone by combining properly the simple elements of which it is composed—he does more: he changes one element into another. He has learned something about the real nature of matter; with this to guide him, and with experiments of past scientists for a starting point, he has been enabled to rearrange basic substances in such a way that for example what was rock, or wood, or air, becomes a thing entirely different. He can take an apparently worthless boulder and turn it into enough food—many varieties of food, mind you!—to feed a dozen families for a year. Thus a hope that land might continue valuable for raw material, vanished; food for the entire world can be manufactured from the material dug from a few city lots!"

"But now that you know beforehand the certainty of a decline in land values, why not dispose of your farm mortgages and change to safer securities?" I suggested.

"Too late," said Hendershot. "The Realtors' Federation has already sensed what is coming; among business men, the scare is on, and all we can do is hold the bag, in hopes that either the food's popularity is short lived and there is a swing back to natural food, or that at the worst, the cities do not begin drawing heavily on their Posterity Funds. That last thing, I am most concerned over, and it is concerning it that I called you in here. We must keep the cities from making large drafts on their funds if possible. Through our friends we must start propaganda against the erection of new and expensive public buildings. We must broadcast ideals of thrift. We must hold up to the people's eyes the thrift of the Funds' founders, the thought that extravagant uses of the Funds would be dishonorable!"

PRESIDENT HENDERSHOT gave me detailed instructions as to my work to this end among the other employees; then he dismissed me. In thirty days everybody was eating the new food, just as the President had prophesied. Nor was there a swing back to the natural food. Farm crops rotted in warehouses; some farmers realizing the situation planted no crops when planting time came. In six months we knew that farming was an industry of the past, the farm lands of the earth became comparatively worthless.

"Knowing this, we worked hard spreading ideals of thrift among the people—the people of the cities with the Posterity Funds. But despite all our efforts, one city after another began contemplating ways of spending the vast sums which were soon drawable. Cities began competing with each other in their plannings. Where one city announced its intention of building a fifty million dollar City Hall, another retaliated by announcing the project of a hundred million dollar public aerodrome. Some other city hit upon the idea of combining a promenade and park with an aerodrome and ran the cost up to a hundred and twenty-five millions! Then there was the city that sought to get ahead of all the rest with the plan of enclosing itself completely with glass, and making its own weather. This was to

cost, I think, an amount totalling half a billion dollars!

"These are but a few instances of what thousands of cities contemplated. The publics of the entire world became crazed with the idea of municipal magnificence—and there was another reason for the enthusiasm also; property owners would profit by improvements to the cities; property owners therefore became propagandists for extravagances before which our thrift-propaganda paled to nothing.

"The first Posterity Fund fell due, and was promptly used to pay contractors for structural work already finished. It was but a small sum—twenty-five million dollars I believe—and the small city that checked it out made itself notorious the world over by holding a spectacular carnival to signalize the first benefits from the Posterity Fund idea. Day after day others availed themselves of their funds, all of them so far small, for during the craze of two hundred years before, it had taken some time to work up to large figures; but steadily the time approached when the bigger funds—stupendous amounts they were—would mature and be drawn on to an extent in keeping with their size.

"By wonderful shrewdness on Hendershot's part the International had thus far met all its obligations without wavering. But in some manner word got out that it would not be able to meet the bigger demands that were coming. The rumor spread. Persons who had never before given the inner aspect of banking a thought, now began studying the situation, seeing for the first time the effect the synthetic food must have on the banking business; realizing suddenly that the crash in land values might soon have an effect upon their savings accounts. Many withdrew their savings. For a time the alacrity with which the bank paid over their money renewed confidence in us. It was but a temporary holding back of danger, however.

"ON the morning of May sixteenth, twenty-one hundred and thirty—"

"*Destruction Day*," murmured the girl with involuntary awe.

"On the morning of the sixteenth," went on the old man, "we were drawn upon for one hundred million dollars, by a South American city, the name of which I have forgotten. We were still able to pay; we could have paid this sum and several more like it—but President Hendershot, who in the last days had been giving close attention to details he should have left to his subordinates, lost his head.

"Grabbing the radio instrument from me, he told the city treasurer that several days would be required in which to check up on the sum before it could be paid. This might have been all right had his voice been calm, but it was not—there was an unmistakable note of excitement in it; a fatal thing, considering the past rumors. By mid-morning, looking in our televisions—apparatus with which we could view the activities of any part of the world at will—we saw the entire continent of South America wrought up to the highest pitch of excitement, business being neglected, volatile Latins congregating in vociferous mobs on the streets of the many cities.

"It was the beginning of the end. By noon the less excitable northern peoples—those of North America, the northern parts of Europe and Asia—were in a state of excitement on a par with their southern brothers. And as the minutes went by, the excitement increased: every radio instrument in the vast building of the International was buzzing. Everybody was attempting to draw out his money all at once. Even had we been able to pay all—which we weren't—we could not have paid them all at once; the task would have taken days.* So of course the majority of the depositors remained unpaid and helped to swell the excitement.

"By three o'clock the world knew the truth. The excitement changed to definite action on the part of the people. Perhaps not one per cent of the world-wide range of depositors had ever visited the International Bank—or any banking house for that matter. There had been no need, all business being done by radio and by lightning-like delivery systems. Now, obeying an instinct that dated back two or three centuries, men began swarming to the bank, as though they might in person do what by civilized means they had failed of doing.

"At a few minutes after three the first of the aerocars began to appear—from points within a few hundred miles radius. They landed on the green lawn like small beetles seemingly, so large was the lawn in extent. After landing, people got out and began congregating in little groups, apparently not knowing what next to do. From moment to moment more cars arrived, some of them single passenger, others big machines bearing scores of persons. The groups grew in size and commenced to move toward our building. When they got within two or three hundred yards the persons in advance halted. It was clear that the impulse which had caused them to come was not yet strong enough to overcome the restraining influences of many civilized generations. For nearly two hundred years there had been no such thing as a run on a bank; banks had come to be regarded as sacred institutions—even with all the knowledge that the great International was failing of its trust, the sight of the stupendous building, the very name itself, seemed to overawe these people, to make them falter.

"They halted, and crowded up together, as if seeking confidence from one another. People continued to arrive; by four o'clock huge continental cars from Mexico on the one side and Canada on the other glided down, a thousand persons alighting from each one. At five o'clock transatlantic aero-liners were depositing hordes of passengers every minute; the air was dark with cars of every size and make—a veritable cloud of them swooping in on a hundred different air-levels. The grounds surrounding the International were no longer green but a sort of grayish-black, appearing as though countless millions of strange insects had lit upon the grass, obliterating it entirely. We were completely encircled by humanity, the distant reaches of the mob tumultuous and pressing nearer, the inner rim of it still holding back, but constantly being shoved forward by those behind. Bordering the building was a cement walk some two hundred feet wide; part of the crowd

swung forward upon this. For some reason it seemed to give them confidence. One man mounted to the top of an ornamental post that stood near and began shouting excitedly to the persons farther away. Others took to shouting; fists were flung above heads; a curious rippling movement began agitating the miles of close-packed people.

"The employees' usual quitting time on that shift was four, but of one accord all had remained within the building—nearly two thousand of us. Panic now seized us. We were behind stone walls, the Bank's thick steel doors were closed and locked, the windows of thick bullet-proof glass were locked—yet we had the feeling that in some manner the millions outside, by sheer force of numbers, would be able to make their way inside.

"I remember seeing in a flash of imagination the building being toppled as by the waves of a terrific sea: thousands of men being crushed against the stone walls by the forces behind; then slowly, relentlessly, the increasing of the force, the cracking of masonry, destruction. Again, I found myself visualizing the over-running of the walls and window ledges, balconies and the roof itself, as by millions of ants; one of them finding some overlooked crevice by which to enter. It was all reasonless, but the others were with me in the unreason: a few minutes after five I was apparently the sole person remaining in the building. My co-workers had vanished quietly in little groups, doubtless making their egress by one of the secret bullion delivery tubes underground. As it later turned out, all had deserted but me and President Hendershot.

"I WAS in the dome, round, glass-walled and the highest part of the structure. From this place I could view the crowds on all sides of the building; also, by looking through a circular opening in the floor of the dome, I could see a part of every floor below me. It was on looking down that I beheld President Hendershot—saw him standing by a curtained French door that opened out on a balcony at the building's front.

"He intended, seemingly, to step out and attempt to placate the crowd. For a moment, so futile did such a plan seem, I thought of following the other employees. I could see no use in staying. The Bank seemed doomed; I might as well save my life while there was yet time. I had no illusions as to what the crowd would do should it once get inside.

"But I was a fatalist; I remember having a strange feeling that, whatever happened, my time had not yet come—I would continue to live through it all. From a state of panic I became very calm. I watched and saw President Hendershot with grim determination open the door and step outside. I heard a great mob-shout well up, such a shout as I had never before heard. Missiles began flying through the air—a century earlier, before the great crusade against crime did away with all firearms, Hendershot would have instantly been killed. As it was, he plunged hurriedly inside, while a hail of small stones rattled against the glass of the door.

"The stones seemed to give the mob an idea. The

ornamental stone posts at the edge of the lawn were beset by as many persons as could get to them, the intention being to use them as battering rams doubtlessly. But they stood. The battering idea continued to work, however. Far back a solitary aerocar rose. It was a small racing car, with the merest suggestion of planes, and a nose like one of the twentieth century steel-jacketed bullets. It circled the building, the mob watching it expectantly. Then it straightened on its course and came direct for the great main entrance doors!

"I FOUND myself held for an instant in speechless admiration at the thing the car's occupant intended to do. He was a fool—one of those occasional mad idealists of history who forget death in a mad moment of glory; he was magnificent. There wasn't a chance that he could survive his deed. He drove straight onward for the doors like a great angry beetle. At two thousand miles per hour, three thousand feet per second, he was just a blurred streak. He struck; there was a pop, then a rending of woodwork and metal grillwork on the other side of the bank's interior; and where the heavy steel doors had been there was now a ragged hole toward which the mob began to surge!

"To my ears came the whir of an automatic elevator. President Hendershot next instant sprang to the floor on which I was. As I have said, there was a hole in the floor that gave a view of the different floors below. Especially did it give a view of the large room or foyer of the main entrance. The President glanced swiftly at the entrance, seeing as did I the first of the mob pour through the smashed doors.

"Then, with a bound, he was in a little room on one side of the floor aperture. This was a watchman's booth. It was equipped with an inter-department television, an instrument with eyepieces through which the watchman could see the interior of every room in the entire bank. But the President had not gone in there for observational purposes! As I saw the next moment, it was for something quite different.

"As I have mentioned before, scientists had begun to understand matter. The principle employed by Scott in his changing of one element into another to aid in his producing food artificially had been employed to further less praiseworthy things; warfare for instance. A colonel of air forces had discovered that air may be changed to a deadly poison gas by changing slightly the orbits traveled by the electrons that, along with protons, compose it. (You do not understand what I mean by 'electrons' perhaps—but they are tiny particles which are parts of larger particles along with protons, which finally, in great numbers, make the thing known as air.) He worked the proper change in these electrons by playing upon them an electric current transformed by fire being passed through a disk-shaped instrument that produced a peculiar wavelength.

"With this transforming apparatus warfare became such a deadly business that every nation quickly became peaceful, and the death-dealing weapon which the colonel had invented found a use in industry: it was a fine thing to use against burglars. In the booth in the dome of the International Bank was a series of buttons,

electric switches, levers and dials. The watchman, by pressing a certain button, closed the doors of any room he chose, at the same time turning the room's atmosphere into a deadly gas. This kind of protection, of course, could not be resorted to when the room might contain employees of the bank, but only on occasions when the sole person appearing in the room would be a burglar.

"President Hendershot pulled a lever and pushed a button. Instantly the aperture in the first-floor ceiling became closed, shutting off my view of what must happen to the throng that rushed in, and at the same time securing us from the poisoned air. For a moment I thought the President's plan had succeeded; then I saw the mob continue pressing to the door from outside. The President peered into the eyepieces of the television and his hands began shaking as if palsied. He pressed other buttons, pulled other levers. I remember rushing forward and shouting: 'What's the matter?'

"The open main doors!' he ejaculated.

"Then I knew. The electric current was too weak to be effective in a place with open doors; the poison gases were diffused and diluted by the outer air.

"**B**ELOW, I heard a tremendous commotion—the noise of thousands of persons swarming up the inclined planes that served as stairways. I saw the President tear the transformer disk—a plate-like thing of copper and blued steel—from between two small wires, and next saw him leap with it to a high-power radio transmitting apparatus. He cut a wire that led to an aerial outside and in an instant had clamped the two ends in sockets on either side of the transformer disk. He turned a knob; there was a low, deep, droning sound. He sprang back to the booth and pulled a lever, closing the hole in our floor.

"We were now in an air-tight dome. I still heard the commotion of ascending footsteps. Then suddenly the commotion ceased. I looked out through the glass walls of the dome—and where a tumultuous mob had been, there was nothing but motionless, prone bodies. I glanced skyward: aerocars had been continuing to arrive, the sky quite black with them; now the clouds of them had become an erratic maze of uncontrolled machines. They sped this way and that, colliding with one another, car after car dropping to earth, some in a blaze of fire.

"I realized now what had happened: Hendershot's ingenious insertion of the transformer disk into the powerful radio set had changed a puny gas-making apparatus into one of unbelievable capacity; the atmosphere for miles around had been transformed to poison gas, and this had, of course, entered through the broken main doors and killed those who came up the inclines.

"This I realized, and more. With horror it came to me that perhaps the air of the entire country was being turned to poison gas. The radio had a loud speaking radius of twenty-five thousand miles; we had tested it out once by broadcasting a series of messages around the earth. Its tremendous power might well be broadcasting death over a great area.

"I leaped toward the instrument, my hand out-

stretched to turn it off. Just as I had almost reached it a body hurled itself upon me and I was borne to the floor. President Hendershot was gripping me with the power of an insane person. As I struggled about so that I faced him, I saw that he was indeed insane. His habitual nervousness, his intensity of gaze, had become the frenzy, the glaring gaze of a madman.

"I got to my feet and we writhed and twisted and clawed as ferociously as a pair of primitive beasts. I tried to work my way to the knob; Hendershot, with the purpose of a demented fiend bent upon murder, kept me from getting to it. Above the radio set was a huge silver screen, a gigantic television object-field that gave glimpses of different parts of the world in a continuous flicker of pictures. It operated whenever broadcasting was being done. Now, happening to glance up as we struggled about the room, I caught a glimpse of a thronged street that I knew instantly for the Boulevard des Italiens of Paris, France—and even as the picture flickered to my eyes the throngs melted like grain before a sickle. Not only was death being broadcast over a large area of country, it was being broadcast over the entire globe!

"**T**HE awfulness of the thing lent me new power. I realized in a dim sort of horror that the life of the entire planet depended upon me, depended upon my reaching and turning the knob of the radio set. With a frenzied force I tore loose from Hendershot and sprang toward the knob. He leaped in front of me, blocking me. For a moment we dodged from side to side, Hendershot with his back to the knob, body crouched, fingers crooked ready to seize me. I had no confidence in my ability to wrench free from his clutch a second time, so for the instant I was wary, keeping clear of his hands—at the same time trying to think of some means to get to the knob.

"Even as we dodged back and forth the increasing necessity for turning off the current grew apparent: on the television screen new pictures were flashing in swift succession—a public square in Madrid, Spain, lit up to dazzling brightness by its great white arc-lights, its promenades covered with prone bodies; Cairo, Egypt, its narrow streets cluttered with motionless figures and with figures that constantly fell and became motionless; high up in the Himalayas, in a monastery, black-gowned monks sank to the rough stones of their high-walled courtyard; in a rubber settlement in the jungles of South America swarthy-skinned laborers staggered and went to earth, a dog sank down and stretched himself out as if overcome by slumber, a bird fell out of the sky, landing beside the dog's head. . . . There were scores of other pictures, and in some few instances there were as yet no dead; it was the possibility that some regions were protected by a peculiar state of the atmosphere and would be immune for a few minutes, that made me continue trying to reach the knob.

"All this while I was weaving about—and thinking, thinking desperately. Out of my boyhood, two and a half centuries back, came recollection of a favorite sport, one that had long since been discontinued by the world—boxing. Not the clumsy boxing of the present,

your era, but scientific boxing. I fainted, then crashed my fist into the mad President's jaw. The force of all my frenzy was in that blow; it knocked the man down.

"I was twenty feet from the knob, and Hendershot was on the floor. I rushed for the knob, seeing Hendershot rise to his hands and knees. Afraid that he might attempt grasping my legs, I darted far to one side of him. But he was intent on another thing, as next instant developed. I heard a click—I should have paid it no attention, but the sound of it and what it meant caused me to whirl when within three strides of the knob.

"Hendershot, I saw now, had reached and pulled the lever that opened the air-tight floor door to the dome!

"It was the act of a madman; even as I realized what he had done and turned frantically to reach the knob while there was yet life in me, that life seemed cut off. I felt myself being gripped by a strange, swift numbness. There was no pain; there was no clouding of brain—my mental action and eyesight remained unimpaired. But I seemed to have practically lost the power of movement. My hand was within a foot of the knob; as though the air was glue and I was stuck fast in it, I struggled forward that foot. I remember how, as inch by inch, my fingers drew nearer the knob, the scenes on the television screen continued flashing, each new picture bringing to me added horror, greater desperation.

"At last my fingers touched the knob. This I knew by sight only; there was no feeling in my fingers at all. I managed to curve my fingers around the knob—and could not turn it! My arm and hand, my entire body, seemed to have become dead as cold marble. I was like a marble statue, standing there with my hand on the knob that held in it the destiny of Civilization—unable to give it the twist, the mere half-twist that was necessary!

"I have since wondered how it was that I was able to remain on my feet, why I did not fall; but I suppose it was due to a peculiar rigidity of muscles accompanying the paralysis; rigidity and the fact that my hand was on the knob, giving me support. I remember *trying* to fall, thinking that the movement might cause the knob to turn; but I hadn't even the power to throw myself off balance! All I could do was to stand there, a corpse in every way except mentally; a staring, horror-stricken corpse, seeing the human race's destruction in a series of pictures that flashed continuously on the television screen. White-lit metropolises, little towns and big; villages in remote recesses of the Alps; resorts on South Sea Island beaches; settlements in the heart of African jungles; wherever there was a radio station, there arose the pictures—pictures all alike, cluttered with prone bodies. For eternities I seemed to stand there, seeing those flashing pictures; then my senses failed me.

"I CAME to on the floor. The pictures had ceased to flash, the radio to buzz; this, of course, was be-

cause the power plant that supplied the current had ceased operation; its personnel was dead. It was due to this and another fact, that I still lived. The other fact was—the door in the floor below the dome was closed; thus the dome was fed only the poisonous atmosphere in the room beneath, which probably contained but a trace, enough to paralyze me only temporarily.

"Hendershot, however, had not fared as well as I. He was dead. I do not think the poison alone killed him; I think it was probably a combination of weak heart, shattered nerves, *and* the poison.

"At any rate, he was quite dead when I rose to my feet—and so, I had no doubt, was the balance of mankind. It was only after years of wandering over the fast-crumbling ruins of that past great civilization, that I found myself incorrect in my belief—I found a hunchback, a half-demented creature, living like a rat in a damp basement of a huge office building in New York. He had survived, as a few animals had survived, by some strange fluke of fate, while all about him had perished. It was not much to go on, but it gave me hope; the hope, that after nearly four centuries led me finally across the continent of North America and to the first of the little stone-walled villages of your people, the start of the new white race—steeped in ignorance!"

THE Boy and the girl looked at each other as the old man finished speaking—looked at each other and blinked as if waking from the depths of an enticing but not very understandable dream.

"That may have been *your* way of escaping the Great Destruction," voiced the boy, with a sly wink to the girl.

"But our way—our people's way—was different," took up the girl. "As everyone knows, and as such an old man as you ought to know; the Angry One told our people, the Chosen—some men and women by the name Smith and Williams and a few others—to get into a kind of boat that went under water where they would be safe. When they came up everybody was dead from the Great Anger—"

"The boat," broke in the old man, "was a submarine. It was the habit of people sometimes to go on ocean-bottom excursions in such craft; due to carrying their own supply of oxygen, the persons in this craft naturally were saved, coming to the surface after the poison had been dissipated. It was natural, of course, that significance should be attached to their being saved in such a manner—"

The old man broke off with a hopeless shrug, called to his wolfish dog and trudged wearily away.

For a little while boy and girl watched him, saw him grow dim in the trail's gloom, a wanderer whose destination was a vaguely known region of great wildernesses and few people. Then, "The old liar!" said the boy, and hand in hand the two started back to the village of stone huts.

The English at the North Pole

By Jules Verne

(Continued from page 137)

no responsibility now; I shall watch the course of events and do whatever I am told without expressing an opinion."

"Let me tell you, Shandon, you are wrong. This is a question of our common interest, and imprudence on the captain's part may cost us all dear."

"And would he listen, Wall, if I were to speak?"

Wall could not reply in the affirmative. He evaded the question by asking whether the representations of the crew would have more effect.

"The crew!" repeated Shandon, shrugging his shoulders. "Why, Wall, you surely cannot have noticed the men. They are not caring the least about their safety just now. All they know is, that they are getting near the 72nd parallel, and that each degree beyond that will bring them a thousand pounds!"

"You are right, Shandon," replied Wall. "The captain knows the best way to keep his men."

"For the present, at any rate, it is the best," replied Shandon.

"What do you mean?"

"I mean that while there is no danger and no hard work, things will go on very well. Hatteras has caught them with a golden bait, but what's only done for money is never much worth. Wait till we get into difficult and trying circumstances; wait till sickness, and cold, and misery, and despondency come upon us, and all the calamities towards which we are madly rushing, and you'll see how few of them will think much of the prize to be won."

"Then you don't think, Shandon, that Hatteras will succeed in his attempt?"

"No, Wall, he will not succeed. An enterprise like this requires perfect harmony of thought and feeling among the leaders, and this is wanting among us. More than that, Hatteras is a madman. All his past history proves it. Well, we shall see. A time may come when he will be compelled to give up the command of the ship to a less venturesome man."

"I don't know about that," said Wall, with a doubtful shake of the head. "He will always have some to stand by him; he will have——"

"He will have Dr. Clawbonny," said Shandon, interrupting him, "a learned man who cares for nothing but learning; Johnson, a sailor, who is a slave to discipline, and who never takes the trouble to examine a question; and perhaps one or two others, such as Bell, the carpenter, not more than four at the outside—four out of eighteen of us. No, Wall; Hatteras has not the confidence of the crew, and he knows that well enough. He bribes them with money. He managed to work on their excitable natures very cleverly with the Franklin story; but that won't last, I tell

you, and if he does not succeed in reaching Beechey Island, he is ruined."

"If the crew only suspected that——"

"I beg you say nothing to them whatever on the subject. They will soon make their own remarks. Moreover, we could not do better meantime than continue our present course. Perhaps, after all, what Hatteras thinks is going north may prove to be going back. McClintock Channel opens into Melville Bay, but that succession of straits that leads to Baffin Bay, begins there, too; Hatteras had better take care! The road to the east is easier than to the north."

Shandon's words revealed his secret sentiments. No wonder Hatteras felt he was a traitor.

As far as the crew went, however, his opinion of them was quite right. Their contentment was entirely owing to the prospect of soon reaching the 72nd parallel. The love of money had taken complete possession of them, and Clifton had calculated accurately the sum that would fall to each. There were sixteen men altogether on board, not counting the captain and the Doctor, who, of course, were not to share in the prize. The amount promised was £1,000; that gave £62 10s to each individual. Should they ever reach the pole, the eighteen degrees more would enrich them still further with a sum of £1,125—quite a fortune. This would cost the captain £18,000, but he was rich enough to be able to pay it.

On the 16th of June the *Forward* coasted past Cape Aworth. The white peaks of Mount Rawlinson seemed to pierce the very heavens, the snow and fog making its height appear colossal. The temperature was still some degrees above freezing point. Cascades and cataracts were rushing down the sides of the mountains, and the loud noise of falling avalanches struck upon the ear like the continuous discharge of heavy artillery, reverberating over the glaciers for an immense distance. It was a splendid spectacle, and the ship hugged the coast so closely that objects were distinctly visible. Rare heaths were discovered growing on sheltered rocks, with their pink flowers timidly peering above the snow. A few miserable looking lichens of a reddish color were also seen, and a dwarf willow, which crept along the ground.

At last, on the 19th of June, the 72nd parallel was crossed, and the brig entered Melville Bay—the "Silver Bay," as Bolton christened it. On the 25th, in spite of a strong breeze from the N.E., she passed the 74th degree, and found herself in Melville Sound, one of the largest in those regions. It was Captain Parry who first traversed it in his great expedition in 1819, and it was for this his crew gained the prize of £5,000 offered by Government.

The INVISIBLE FINITE

By Robert A. Wait



YOU may readily see that as the bicycle wheel speeds up and revolves faster and faster, its spokes, though shiny and bright, tend to disappear. The vision is practically unimpaired by these rapidly moving objects even though they be made of steel. Generally, the impression is that an object moving rapidly becomes more and more difficult to observe or even see as the speed of motion increases."

Professor Moore hesitated, to allow the full significance of his statement to sink into the more or less intelligent group of students in his advanced science problems class.

"To those of you who follow closely, I may point out that this very simple phenomenon may, at some time, take on a vastly important significance. Obviously, if we can cause the spokes of a common bicycle to completely disappear by moving them rapidly before our eyes, it would be possible to extend this principle to still larger and more complex uses. Whole parts of a machine may be made to disappear or even the threads of a cloth might be made invisible by causing sufficiently rapid motion of the same."

He paused, gazed over his spectacles at the more interested students and, as was his habit, smiled in a rather uncertain way as though half expectant that at least the best students would get the full significance of his remarks. This time he was not disappointed, for the attention of the entire class was focused upon the problem being placed before them. To even the least imaginative, the idea of causing a piece of cloth or perhaps a whole automobile to completely disappear was interesting and smacked of Aladdin at his best.

"One more thought to carry away with you, gentlemen," continued the gentle old man, thoroughly pleased by now that his lecture had so caught the fancy of his class. "If you will observe, not only does the rapid revolution of the wheel

cause the spokes to become entirely invisible, depending a great deal upon the speed of revolution for total elimination of any noticeable flickerings of each spoke, but also, and most important, objects through and beyond the wheel become clear, distinct, and in fact, appear in detail and clarity exactly as though there were no revolving wheel and spokes between the eye and the object. Generally, of course, to make an object invisible would leave a sort of blank space in the surrounding landscape, inasmuch as the object would still be matter which would not pass light rays striking it from

behind. I admit this is a rather fantastic idea and seems rather improbable of realization in practical fields, yet I repeat, young men, this phenomenon, coupled with certain discoveries in the field of the smaller divisions of matter as we know it, leads some of us to hope and suspect the presence of some means used by nature to cause certain of the more rapidly moving particles of matter to completely disappear, thus allowing us to 'see through' them, oftentimes with no consciousness of their presence."

The class bells rang and the students stirred uneasily, humanly desiring the satisfaction of their lunches. The professor sighed, sorry that the period was at an end, for he was deeply interested in his problem and hoped to interest others to the same extent. Calling his two graduate students to him, he asked them to aid him that afternoon in laboratory work which seemed to be confirming his theories on light, its reflection and interference effects.

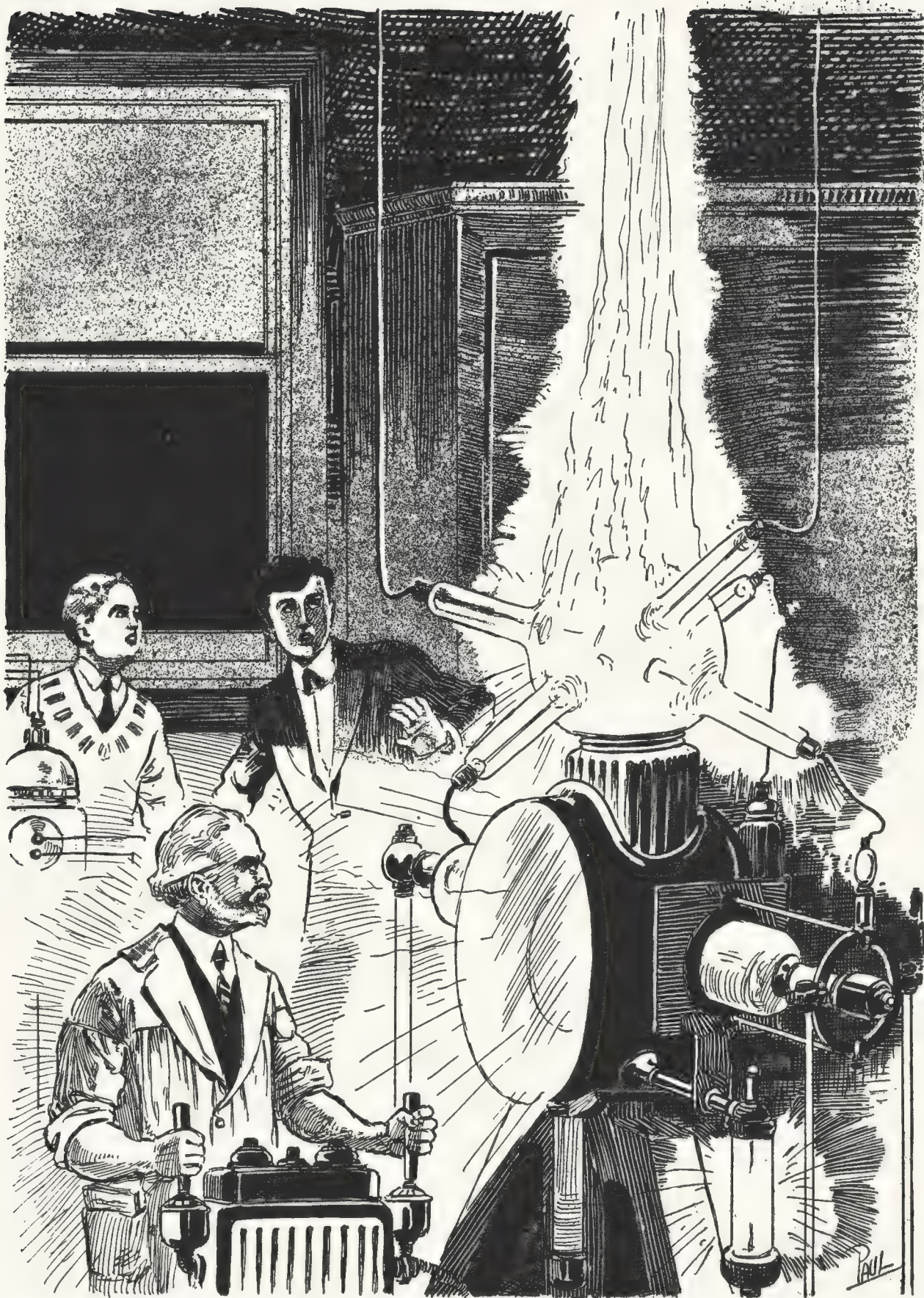
"YOU will remember that during the World War in 1917 or thereabouts many attempts were made by the government, and by private parties, too, to make a cover on the lower side of airplane wings with such a perfect surface that they could obtain a perfect reflection. That is to say, no lines or shadows showing, there could be no distinction made by the eye between the plane or wing and the surrounding objects or sky."

The professor was speaking to his two graduate students the afternoon following his lecture on the bicycle wheel. They had before them several sets of apparatus that appeared to be most complicated. On one side of the experimental room was a completely fitted laboratory for working with chemicals and the compounds that interested these students of nature in her physical and chemical fields. While speaking to the young men, one a tall young Irishman, Jerry Murphy, the other a dark young

Brazilian of exceptional mental ability, Carlos Manoras by name, the grey haired scientist rubbed a piece of shiny metal vigorously. The metal seemed to be an alloy, dark blue to purple in color, very tough, hard, and rolled into unbelievably thin sheets. One after another the sheets were handled by a member of the trio. The process seemed to be one in which the razor-edge sheets were given a coating of an oily liquid and then rubbed clean and dry with especially fine silk cloth.

"Needless to say," the deep-voiced young South American took up the thread of thought where the

WHEN a Scientist turns "Scientifictionist," something good is to be expected. The author of this story is an instructor in chemistry in the James Millikin University in Illinois. He is also a Research Chemist in his spare hours. With these facts in mind, the brilliant endeavor from his pen will gain additional momentum, for you will know that an authority speaks. A great deal that the author brings you is new, which makes one realize more than ever that there are few things in science that can be called impossible. We heartily recommend this story to you.



The professor plugged the electric cord of the big machine into a wall socket, and snapped on a switch at the base of the aluminum casing. Instantly a brilliant red streamer flashed toward the ceiling, suffusing the room in a carmine glow... the two students started back from this demon of light, half frightened by the thousands of sparks and streaks of miniature lightning crashing across the gaps on the coils below the main part of the machine.

professor had dropped it in adding an especially fine film of the polishing material to his sheet of the beautiful purple metal, "no such a surface was ever developed. If the attempt to get perfect reflection had succeeded, the results would have been very disappointing, for the airplane must at times pass through or below clouds, and even with a perfect reflection, the outlines of the plane would be visible, for the rough surface of a cloud or a landscape would cause the smooth edges of the plane to stand out as though they were painted a brilliant color. The whole plane would present a sort of blank space, as you mentioned this morning."

"Of course, the idea sounds good at first and is, in a sense," rejoined young Murphy, removing his collegiate briar from his mouth long enough to propound a thought. "The big difficulty would be that, from above, the plane would be perfectly visible not only because of reflection but because of the obstruction of the light rays striking the bottom of the "invisible" plane. It would be a dumb pilot who wouldn't recognize the outlines of a plane below him, since, of course, the landscape below would be cut off from observation by the material part of the wings and fuselage. Matter moving at such a slow rate would not be at all permeable to light rays."

"You are both right," Dr. Moore continued. "While it is, or we'd better say, *probably is*, possible to create matter in such a fine state of division that the particles are invisible to the naked eye and hence the whole material becomes invisible, or a perfect reflector, since there are no longer any irregularities to be seen, yet we cannot by this means alone cause the existence to become absolutely unrecognizable to the eye, since even such matter would not pass the light rays striking its back."

They piled the sheets up in a well-ordered stack, and the professor clamped them securely together. The whole they covered with a box or sort of cover constructed of pure fused quartz, so well fused and treated that it was practically clear of all flaws or blemishes. Jerry straightened up, cast about with his laughing blue eyes, and finally went over to where a rather large machine stood mounted on a set of wheels, much like the carriage of a movable X-ray apparatus. The machine itself resembled a violet ray machine with a large bulb of cherry-red clear glass superimposed upon its top. This bulb seemed to have five electric connections that ran down into the bulb to a sort of reflecting anodes, shaped much like the anode reflector in an X-ray machine. In fact, the five-fingered affair looked as though it might be a freak Roentgen ray generator, the excess anodes giving higher power, perhaps. The blunt ends of the anti-cathodes were exceptionally peculiar in this large tube—there seemed to be no end! There was no hole, nor was there a visible surface. That the anode rod was solid could be proved by feeling the end, but all attempts to see any surface resulted in a sort of confusing impression of void space.

"I see you have treated the ends of these anodes, doctor," observed Manoras, examining the machine that Murphy was trundling toward the covered pile

of glistening metal sheets. "They appear not to be, yet I am conscious of a visual impression of some sort of matter. The impression is extremely vague and uncertain."

"That," said the doctor, smiling shyly at the two students, "that is my very latest attempt at a perfect precipitation of colloidal platinum in the sub-microscopic sized particles. You can't see very much because the light is reflected by the tiny particles in so many millions of ways that nothing but a vague impression of grey existence gets to your retina. As a matter of fact, most of these particles are of dimensions smaller than the wavelength of ordinary visible light, and so it takes a small group of them to reflect even one wave of light. Naturally, they diffuse it greatly since the colloidal nature of the material makes the deposit far from even or solid in surface nature. You will remember that molecules are invisible to the eye, even aided by the microscopes of highest power. Were we to start grinding a material from small chunks down to fine particles, even though we trace the pieces through a microscope, we will sometime have reached, were it possible to grind that fine, the molecular sized particles. Now, limiting ourselves to a single molecule, we would have ground a material from quite visible lumps clear down through the colloidal sized aggregations, and finally we would have ground it into invisibility. Truly, that would be most odd, yet it is theoretically possible, as you can see."

"Frankly, professor, what are you trying to do with this work we are helping you to complete?"

IT was a natural and just question that young Murphy asked, and the professor had long expected it. Two young men, bright and intelligent workers in physical chemistry, would indeed be poor scientists if they were content to plod along doing routine jobs for another with no thought as to what was happening or going to happen as a result of their careful labor. The professor sighed as he mentally noted that here again youth would outstrip age, albeit age had contributed the driving force and started the great idea down the swift descent to realization. Dr. Moore knew well that once his purposes were known to the two young men, ideas would flow in voluminous streams from the trained intelligences housed in the rusty-red head of the Irish lad and the dark, bushy head of the Brazilian. Better try to dam up the Mississippi than to stop the flow of thought from two such trained mentalities. No matter, the work would go on and the success would not be his alone. Dr. Moore, as a true scientist, would share in the glory of discovery.

"Jerry, Carlos—"

From this formal salutation the boys recognized a serious turn in the professor's thoughts. They ceased their adjustment work and leaned against the work table in expectant silence.

"You have both worked faithfully and without question at whatever task I assigned you. I want you to know that I sincerely appreciate all you have done. I am about to disclose to you what will make you both famous and prosperous for life. I am an old man. I

cannot hope for more than ten, possibly twenty, years of life. The glory will be ours; yours for a long life, mine for a short decade. Your ideas will supersede mine. I will fall more or less into the background. For that I do not care—only this would I ask of you: always consider me as the origin of your success. With that, I am more than satisfied."

The wondering youths hastened to reassure Dr. Moore that whatever it might be, they were far below him in honor and would always put him first in glory and esteem. The professor smiled a bit wanly and nodded his acknowledgment of the compliment. Behind the smile was a tear, not of self-pity but of sorrow that the human race was so fickle. Despite these vehement reassurances, the professor knew well that it would not be long before the entire proposition would be out of his hands. He would be just "the professor," to be consulted only when the younger men struck a snag in the work. *Soit!* It was ever thus—and as a true scientist, the professor prepared to sacrifice his all, that science might gain the knowledge that he possessed.

"My purpose in this work is to produce a material which will have all the properties of solid matter except visibility to human eyes. I have reached the point theoretically where I am certain it can be done. You can see the result of my treatment of the anodes, and our discussion of invisible planes should bring you to see the possibilities that are involved. The proposition is simply this: As you know, matter, if moving rapidly enough and at the same time far enough in one line, becomes invisible to the human eye, allowing the objects on the other side of the matter to become plainly visible. Again, you know from our work that when matter is divided as particles become smaller and smaller in size, we see them with more and more difficulty. We have spoken of grinding a material from large chunks, quite visible, down through the colloidal stage into sub-microscopic particles that are invisible to the eye—a sort of grinding into invisibility. This has not been found possible as yet, though from my anode treatment in the X-ray machine there, you can get the effect of grey void, the best attempt yet made at invisible colloidal material."

"Of course, all matter is made up of atoms and molecules which are in constant motion, the velocity of which varies according to the particular material; all, however, are extremely rapid in motion. According to our experiment with the spokes of the bicycle, this motion should cause the particles to become invisible. The fact that, though in rapid motion these particles are visible in the aggregate, is explained by the very short length of the path of motion. All solid and some liquid matter has the particles in it so arranged as to allow each particle to vibrate about a mean point, much as a ball on the end of an elastic cord. Could these particles be induced to stretch these forces and vibrate at enormously larger distances than their natural period, it would seem possible to cause them to become invisible, much as the increase in the speed of rotation of the spokes in a wheel causes the spokes to tend to disappear. Now, could we combine the two

theories—rapid motion in comparatively long paths, and sub-microscopic size in particles—both of which cause more or less invisibility, we should have an invisible material.

"To me, it is evident that the gases as we know them are invisible, except for color, because of two things: First, the state of subdivision is so minute that we get practically no reflection, or perhaps we might better say that the particles are so small that one will not reflect a light wave—the wave is longer than the particle is large in diameter. Since our second point is that these particles are not held in a mean position by any forces, but travel in Brownian movement in straight random paths until they rebound with perfect elasticity when they collide, thus never losing any velocity, I conclude that the velocity of the particles, coupled with the length of their paths of travel and their very small size, causes them to become invisible to the eye."

The young men had shifted their positions until they were half reclining on the work table, very intent on what the professor was saying. They were absorbing every word with the agility of a mind intent on learning. It was evident that the professor's arguments were convincing the South American lad, and even Jerry's face was glowing in eager anticipation of further explanation of their work.

"That's a very plausible theory to me." Carlos spoke with great enthusiasm, his mobile face animated with an interest even greater than Dr. Moore had hoped to inspire.

"Tell us what all this has to do with these alloy sheets and this mysterious machine you have never explained to us, doctor. Your theory is certainly staggering, but I am a bit incredulous yet. Remember the scientific attitude we learned in freshman years—'Never jump to a conclusion because the evidence seems strong.' You yourself have often cautioned students against too hasty acceptance of ideas that are apparently wonderful in possibilities."

YOUNG Murphy uttered the latter part of his not too enthusiastic comment in half apology for even seeming to dispute Dr. Moore. He was a hard-headed young fellow, but, as with most Irish people, as lovable as could be found. It was only because he was a good scientist that he was skeptical. Early in his career he had learned that scepticism was not a vice—more of a virtue, oftentimes preventing false conclusions based on insufficient evidence.

"These sheets that we've been working on are an alloy of gold. You know that many alloys of gold are extremely hard and that some alloys are beautiful in color. This alloy has both gold and uranium in it. The uranium is present in only minute quantities. It is present because of its radio-active properties. This seems to promote the activity I am after. The polishing process which we go through is to cover the sheets of alloy with a thin coat of the colloidal platinum like that I used on the anodes of our Z-ray machine. I call it Z-ray because I really know no other name for the particular ray I produce with the machine. The oily liquid we use is a chloro-platinate which I reduce

to platinum, catalytically, in the presence of some gaseous reducing agent such as hydrogen or carbon monoxide. This leaves the freed platinum in the sub-colloidal state. The oil forms a coating only ten or twenty molecules thick. With the very fine state of division of the platinum, we obtain the hazy impression of grey void noticed on the ends of the anodes."

"I can see that easily," interrupted Manoras, "but I *don't* see that this coating will make the alloy pass the light rays reflected by other objects."

"No, that is true; it won't pass light rays—yet. Bring that black enameled cabinet in the fume-hood. We'll just start this to going and explain as we do it." The professor turned to the chemistry table.

Jerry strode to the fume-hood and carefully extricated the indicated enameled cabinet from the maze of apparatus. True to form, the professor of science had apparatus strewn from end to end of the two-room suite of laboratories.

Dragging a large steel cylinder across the floor, the professor directed manipulations so that he could connect the steel cylinder directly to the top of the cabinet, placing a Bunsen burner beneath so as to heat the sheet iron bottom of the cabinet.

Deftly Dr. Moore removed the clamped stack of treated alloy foil from its temporary housing under the quartz covering and placed it in the cabinet. Carefully closing the black doors and snapping the catches, the professor waved the boys aside.

"The treated sheets are in a gas-tight, heated compartment. You will note the jet at the bottom of the cabinet. We fill this cabinet with carbon monoxide from this cylinder, and since the gas is very slightly lighter than air, we may force the air out through the jet, and by testing frequently with the flame, determine when carbon monoxide has completely filled the cabinet. Since carbon monoxide burns with a bright blue flame, we can easily determine when the gas is escaping from the jet. This we ignite and allow to burn, both to be sure of a constant flow of the reducing agent and to prevent our own asphyxiation from its deadly effect on the hemoglobin of our blood."

The genial old man suited actions to his words and after a few trials, a bright blue flame shot out in a three-inch jet from the base of the cabinet. The jet was so arranged as to burn the gas *under* the cabinet.

"The burning jet of the escaping gas furnishes enough heat to keep the reaction going after we start it with a Bunsen burner, as you see I am doing. Please move that Roentgen ray machine over here and direct a stream of X-rays through the cabinet."

The two youths quickly had the bulb in action, the anode red with the impact of the electron stream striking upon it.

"The gas I am about to entrain in the stream of carbon monoxide is my catalyst. It is only necessary to put in a very small amount as, once the action is started, it goes on without further catalysis."

Dr. Moore attached a small tube of colorless gas to the side valve on the gas cylinder, and opened the glass stop-cock on it. A hiss of escaping gas under pressure, and the professor removed the emptied tube.

"The gas I have allowed to flow in is a form of gaseous sodium metal. I suppose really I should say a mixture of colloidal sodium vapor and inert argon. The sodium alone will not cause the catalytic action, the argon being necessary to the action. Please note the burning jet under the cabinet."

The flame had suddenly turned from the blue of a carbon monoxide flame to the bright yellow-orange, so well known as the flame-test color of sodium or its compounds.

"Remind me to shut off the gas and remove the plates in four minutes. In the meantime, let us look over this Z-ray machine."

THE professor plugged the electric cord of the big machine into the wall socket and snapped on a switch at the base of the aluminum casing. Instantly a brilliant red streamer flashed toward the ceiling, suffusing the room in a carmine glow. At the base of the machine a blinding bar of crystal light swayed drunkenly for a moment, then steadied to a rigid rod. It struck against a quartz plate and seemed to be disintegrated or absorbed thereby. The two students started back from this demon of light, half frightened by the crackle and roar of the thousands of sparks and streaks of miniature lightning crashing across the gaps on the coils below the main part of the machine.

"Have no fear, young men. The light is quite harmless as long as you do not get the crystal light on you. Note—it is not white; it is simply a rod of cold, crystal-colored light. You are conscious of its extreme intensity. Some of its intensity is converted into radiant energy as it strikes the quartz plate, the only thing I have found that is not affected by the Z-ray. It alone I have found will disintegrate the ray—how, I do not know."

"My word! What a machine! Tell us what it is and how it works."

Manoras switched off the machine and mopped his forehead with a white handkerchief. The sudden change had rather upset the nerves of the two younger men.

"As you may have guessed, this machine is for the purpose of increasing the length of the path of the particles in any liquid or solid body—a sort of stretching machine. Every particle has its own period of vibration, and to increase the length of the vibratory path, one must get into tune with the vibration, so to speak. If one tries to increase the length of the swing of a pendulum, he must move his hand at the same speed and vibration as the pendulum. If we can push the particles some way in their path so as to increase the length of their paths, we will reach the point where the size and speed of the particles will cause them to become invisible."

"Yes, but how can this infernal red streak and glow cause that change? I don't see any connection between this machine and pushing particles around."

Jerry Murphy spoke rather belligerently, and the professor smiled at the impetuous lad he had had for so many months in his classes.

"Jerry," began the kindly voice, "I realize that there

is apparently no connection between the machine and increasing the velocity of molecules. You will get more from the idea if you will suspend judgment a while. The red glow is caused by the colloidal gold in the ruby glass over the top. The particles in the glass are exceedingly small aggregations of molecules of gold suspended in the super-cooled liquid we call glass. These transmit and reflect red light. The size of the colloidal particle controls the color of light to be reflected or transmitted. In the case of the blue light reflected from tobacco smoke or some wood smokes, the particle is of such size as to cause Tyndall's law to take effect. You will remember Tyndall found that in reflecting white light, colloidal particles of this size reflected the colors of the rainbow in intensities inversely proportional to the fourth power of their wavelengths. Thus, since the blue light has the shortest wavelength, the inverse fourth power would be the largest number and hence the greatest color in visible intensity. Lilies owe their white color not to white pigments but to the diffusion of light striking the very tiny colloidal bubbles of air in the lily petals. Of course, when all colored lights striking the lily petal are diffused thoroughly, they mix and form white light. The same phenomenon is found in the case of white hair—no white pigments are found—only colloidal bubbles of air to so diffuse the light as to appear white. As to this machine, the red light is purely accidental. I did not design the machine to make red light. I used ruby glass because I find the Roentgen rays do not penetrate the glass as was heretofore believed. The light is a by-product of the true purposeful action of the machine. Observe, please."

Dr. Moore took off the red cap of glass from the machine, exposing the five anodes arranged in an arc, each pointing toward a central point in the lower body of the aluminum casing. Opposite each anode was a beautifully coiled tungsten wire cathode from which electrons were discharged at the anode. All these anodes were so leveled and arranged that all the angles of incidence in reflecting the bombardment of electrons focused at one narrowing slit—a sort of rectangular funnel pointing straight downward toward the quartz plate at the bottom where the rod-like ray of cold light was focused.

"When this five circuit X-ray machine operates, all the reflecting anodes have their positions fixed to throw all X-rays generated to this one point—the vortex of the funnel-like piece of the casing. That metal looks like aluminum but is really a lead alloy of that metal. It is especially efficient in stopping Roentgen rays. Please observe that I can control each of these five circuits separately."

"Professor! The cabinet!" Manoras cried in alarm.

A FULL ten minutes had passed since the four-minute reducing period was to have ended. The plates of alloy were removed carefully and, contrary to the fears of the professor, they seemed to be perfect and unharmed by the over-reduction. Strange it was indeed to handle this pile of nearly invisible foil. The grey void of the anodes was seen again. There was the

clamp with a grey, dark-appearing mass, with an elusive, shapeless appearance, between its jaws.

"We will proceed with our experiment," said the professor, placing the plates without the clamp in the quartz box, leaving the open top with no cover. He slid this into the X-ray machine immediately below the funnel-like aperture and in the path of the rod-like crystal light.

"Before I turn on the current to make the final test of success or failure, I want to explain the real action of this machine. Have you ever seen a band leader or orchestra leader wave his baton where the light is rather poor? If so, you have noticed that the baton appears to stutter or vibrate through the light—a sort of poor motion picture, where one sees the wand in one place, then sees nothing for a short space with a quick reappearance beyond, and so on to produce a stuttered appearance. This phenomenon is due to light interference. In places the light reflected by the baton is interfered with and lost to the eye—a sort of "now you see it, now you don't" idea. I take advantage of this in causing these Roentgen rays to interfere with each other, making a sort of staggered but regular pulsation of X-rays. Some of the rays generated never get to their destination, but because of interference are used up in producing this red glow and beam. The five anodes enable me to control the speed of the interference, thus getting any vibration I want, through interference from two to five separate rays. The pulsating X-rays thus generated are sent through the funnel-like apparatus, where all but the rays passing straight through are absorbed into the walls. Thus, all rays going through the slit-like opening will be parallel in motion—no cross rays. In other words, I polarize the pulsating X-rays. The cold light, or crystal light, is this stream of polarized, pulsating X-rays. By throwing this ray onto any solid or liquid matter, I can cause the pulsation to synchronize with the natural period of the vibrating molecule, and slowly but surely speed up the motion and elongate the path of vibration until the invisibility effect is noticed."

So saying, the doctor switched on the current and the crash of large spark gaps again filled the room. Once more the room was suffused in a red glow and the crystal light steadied to a rigid bar of blinding brilliance. The three leaned forward toward the machine in close and excited observation of the plates of alloy. No great change seemed to occur. Dr. Moore, however, smiled and, motioning the boys away from the machine, opened two switches on a local bank of five on the machine's neat brown switchboard. Immediately the noise of spark gaps decreased and the red shaft of light softened to a hazy beam; the glow in the room faded to a pink sunset-light.

"I have cut off two of the circuits." The professor spoke loudly to be heard distinctly above the crackle of the spark coils. "It was evident that the five were not producing the correct pulsation to synchronize with the natural period of vibration of the molecules of the alloy or its platinum coating. We must blindly feel for the correct interference effect with different numbers of circuits going at one time. A sort of trial and

error method. We are but babes in the field of higher science, and so we do not see clearly what we are attempting to do."

The pile of plates was now undergoing a color change—a sort of passing through the color spectrum from red to violet. Gradually the color steadied to a clear violet.

"Dr. Moore, I believe we are observing a gradual increase in the speed of those molecules of alloy which takes us through the vibrations of colored light. The red, being slower vibrations, we see that color first and as the vibration speed increases we get the advance along the spectrum in color to the rapid waves of violet light. Why does the color remain at violet and not pass on into the extremely rapid short waves of ultra-violet light?"

At last Murphy was flushed with excitement over what he had questioned but a short time ago. To him it was obvious that the whole experiment was going to be an unqualified success. Manoras spoke to the professor before an answer came.

"Don't you think that all that has occurred is a speeding up of the particle motion? I doubt if the path of motion has been elongated much; in fact, I should judge that the color change would indicate a shortening of the path to suit the increase in speed. Perhaps the only really necessary thing is to cause an extremely rapid vibration, taking the particles up to the vibration of ultra-violet or other invisible light at which point the object would be invisible."

SLOWLY the professor turned a large black lever to the right. The sputtering gaps fairly jumped off the machine in their activity. The noise increased to a roar. No change occurred in the color of the plates of alloy.

"Guess you are both right," the professor shouted, "Try turning on that number four circuit again please, Jerry."

As the fourth circuit sprang into action, the pile of violet colored sheets seemed to fade into thin air.

"Holy Mother!" Manoras spoke as if in prayer. "Professor, I congratulate you. I have never seen anything so wonderful."

The doctor was smiling through tears. His kindly nature was overwhelmed by this success.

"Marvelous, Dr. Moore." Jerry was almost speechless with amazement.

"Now, my friends, we will apply the last test. If we can make visible things invisible, we should be able to make invisible things visible. If we can cause our stream of Z-rays to pulsate in a manner to interfere with the vibration of the molecules you no longer see before you, we should be able to so hinder them that they again slow down to a normal speed of visibility."

Throwing the switch to the fifth circuit, the professor turned back the black lever controlling the intensity of the spark across the gaps. Slowly the violet color appeared, trembled, and with a flash of light the colors of the rainbow cascaded down the now visible pile of alloy sheets. An intense heat radiated from the stack of foil. Suddenly it flared brilliant white, and the once rigid pile fused and slid to a

liquid in the bottom of the quartz dish standing there.

"Too much internal energy loosed all at once. We will have to be more careful in stopping the very violent vibration we set up to cause invisibility. All that energy released at once naturally comes away as heat and light." The professor reached for the quartz dish in which the molten alloy ran about.

"Professor!" Murphy shrieked a hoarse warning, but too late. Dr. Moore's hand was already under the rod of crystal light. A kaleidoscope of color, a cry of anguish, and before a move could be made by either of the boys, the professor had completely disappeared.

Carlos sobbed aloud. Murphy swore violently. Both were wide-eyed and horror stricken.

"Dr. Moore! Are you here? Where are you? Answer us!" Manoras was hysterical. "That damned machine. Why, oh why, did it ever come to be! Never will it harm another!"

Seizing a huge iron bar, he raised it high above his head and brought it down with a terrific smash on the glowing red bulb of the machine. A blinding explosion shook the room. Bottles fell from shelves, furniture crashed into the walls—all was a turmoil. The Z-ray machine literally melted to the floor, a fused mass of wreckage.

"Carlos!" Dr. Moore's voice, faint but sharp, cut through the momentary silence that followed the demolishing of the machine. "Alas, lad, you have cut off forever my hopes of returning to you. Had you not ruined the machine, you might have again brought me to my natural state, as with the alloy sheets. By careful and slow treatment you could have slowed the motion of my molecules till they were again normal. Now it is too late."

"Professor! Where are you?" Murphy fairly shrieked his question.

"Here, Jerry, among you. Yes, really among you, for I find I can pass through your body without your knowledge. I have discovered a great secret, but it has cost me my human existence. My voice is failing. Listen closely, for ere long I shall not be able to speak in a voice you can hear."

"Forgive me! I was wild with rage at the machine I thought destroyed you."

"You are forgiven, Carlos. Now listen. When the visible becomes invisible, it is dematerialized. I find I have no feelings, no nerves. I have no material body. My faculties are gradually passing to a higher plane of vibration than those you possess: they follow my body. Soon my voice will be inaudible to you. Already I see through walls, see through the earth, any material thing. I move with no effort. I have no weight. My will controls my motion. I feel no pain, no cold, no heat. My hearing involves no sound—only a consciousness of what you say. I cannot touch you. I cannot hold or grasp the material things—they slip through my grasp as air would through yours. Mine alone is the secret of the machine which destroyed my human habitat. It has been destroyed and only my hand and brain could rebuild it. Since I am no longer capable of physical action and my voice fades even now, I can never again regain my human form. Mourn

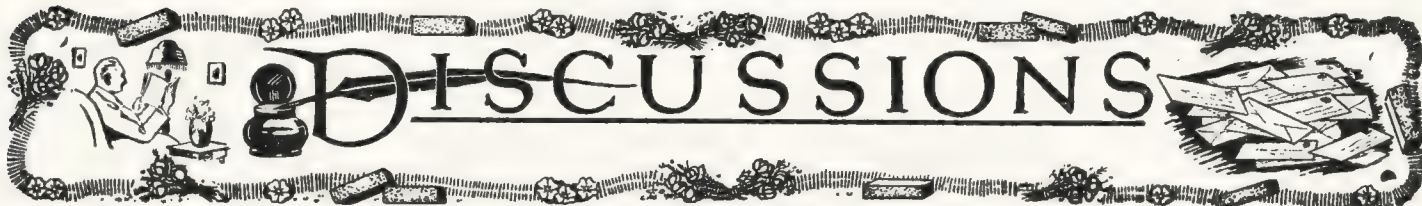
me not. I am not dead, there is no death for me. Perhaps I shall know you again—in—some—future—e—"

The voice trailed into nothingness and the two young men stared with set faces and tear filled eyes into a void and space they could not fathom.

Have you ever felt that someone was present when

you knew you were alone? It is the professor seeking, searching, looking for some one who can understand his sole means of communicating with us. Only through our intelligences and minds can he reach us. What wondrous tale has he of an existence beyond our ken? Will we ever be able to learn more about it?

THE END



In this department we shall discuss, every month, topics of interest to readers. The editors invite correspondence on all subjects directly or indirectly related to the stories appearing in this magazine. In case a special personal answer is required, a nominal fee of 25c to cover time and postage is required.

A VERY INTERESTING LETTER FROM ONE OF OUR AUTHORS

Editor, AMAZING STORIES:

The editorial, "An Amazing Phenomenon," suggested by my story, "The Fifth Dimension," aroused considerable interesting comment. I am reminded of an article that I believe was entitled "Dizzy Arithmetic," that appeared in the *Atlantic Monthly* about four years ago. However, I am not positive in regard to either the title or the magazine. This article advanced some such theory as the editor's: viz., that "in our own physical make-up will be found the actual physical remains of some of our predecessors." The writer of the article went on to prove mathematically, that each one of us contains, for example, so many of the self-same molecules that were in the body of Julius Caesar! The arithmetical proof is what really made this article fascinating reading, but unfortunately I cannot reproduce it all from memory.

I am inclined to feel that the explanation given in the February "Discussions" by David Miles is a very good one; that the phenomenon of precognition "can be explained by lag in the perceptive speed in one of the hemispheres of the brain." This is practically the same idea as that expressed by Wm. S. Wensley in the same issue. It is not quite as appealing to the imagination as the theory given in the editorial; that we have in our bodies the molecules of our predecessors, or as mine; that we live in vast time-cycles that recur again and again, but it does seem a logical explanation and appeals to the reason.

In the March "Discussions" column, George Lasky asks how in "The Miracle of the Lily" a beetle appears after all were supposed to have been destroyed. If you recall, my last chapter was entitled "Ex Terrano," which indicates "out of the ground." However, I did not really want this point to be any too clear, for I merely wished to convey an idea and preferred not to garb it in too concrete language. The theme I wished to be left with the reader was that, after all man's struggle to attain a definite objective (this extermination of his insect foes), and just when he has apparently reached his goal, he discovers that he has it all to do over again. I tried to show in the story that mankind had deteriorated since struggle was no longer necessary. The beetle was the symbol of the work man had yet before him to do. Also I hated to think of the inhabitants of the earth waging war against the well-meaning insect inhabitants of Venus simply because of the latter's unfortunate physical form. If insects appeared again on earth, men were likely to stay at home fighting them and minding their own business.

Mr. Lasky also asks about the pollenization of the plants grown from the seeds found by Nathano. This really wouldn't be a serious problem to accomplish artificially in that advanced age, when it can actually be accomplished on a small scale now.

I hope this satisfactorily explains the apparently

ambiguous conclusion of "The Miracle of the Lily." Personally, I do not like a story to be too explicit. It is often desirable to have something left to the imagination.

A word about Dr. Breuer's "The Captured Cross-Section," which I thought an excellent story of the fourth dimension. That a three-dimensional object would be a cross-section in a four-dimensional world, furnished a very unique plot for this story. The denouement in the story was cleverly handled. One does not anticipate it as he can in so many stories of scientification. The author sees to it that the reader has no inkling of the revelation until he reaches the point in the story that has been selected for that purpose.

I have wondered for some time if I was destined to be the only "come-back" from your prize-story contest of two years ago, but the last issue of *AMAZING STORIES* has a very fine story by the winner of the first prize. The science of archeology lends itself very well to scientific fiction, especially when handled in so interesting a manner.

CLARE WINGER HARRIS,

16301 Lakewood Hts. Blvd., Lakewood, Ohio.

(We have no comment to make on this most interesting letter from Mrs. Harris. We can only say that we are confident that our readers will enjoy it as much as we have, but we believe that none of them will enjoy it more.—EDITOR.)

SOME COMMENTS ON TWO STORIES BY DR. DAVID H. KELLER—THE "QUARTERLY" APPROVED OF

Editor, AMAZING STORIES:

Allow me to congratulate you upon the improved appearance of your magazine with the April Number. It looks almost like a new magazine, I have not had time to read all of it yet but I certainly enjoyed "The Yeast Men." I was very much interested in Dr. Keller's story, "The Revolt of the Pedestrians," which appeared some time ago. I have been reading your magazine for almost a year now and I believe that it is improving all the time; let the good work go on!

The *QUARTERLY* was very good and I heartily approve of the idea of the *QUARTERLY* instead of the annual or semi-annual. I thoroughly enjoyed every story in the *QUARTERLY*; I was especially interested in "When the Sleeper Wakes" by Wells. I am glad you print so much of Wells' works for I find food for thought in every one of his scientific works.

ALLEN HENSLEY,

109 Fourth Ave., Columbia, Missouri.

(We are glad to hear that you consider *AMAZING STORIES* is on the road of advancement. For many months, judging by their letters, our readers are standing by us. We say we are willing to get "brickbats" and will publish them. The truth is that the "brickbats" which we receive are few

and far between and we certainly have published some of the severest.

The great effort of the world for some years is in the direction of doing away with walking. People want to move over the ground on wheels, with a slight variation of skis or skates in winter, and now that we can keep our feet off the ground, we see airplanes impending, which will carry us through the air without any reference to poor old Mother Earth.—EDITOR.)

SOME GENERAL BUT ACCEPTABLE CRITICISMS

Editor, AMAZING STORIES:

I have been reading *AMAZING STORIES* for several months, having missed the first few issues. I enjoy it very much. I have just finished High School, so I am about the age where such stories would naturally interest me. I am especially interested in stories about physical phenomena and about astronomy.

Most of your readers seem to find fault with the stories of Jules Verne and H. G. Wells. The only thing I do not like about these two writers is their tedious style.

Hicks' Inventions With a Kick are all right. However, why not let poor Hicks invent something which is a success?

In *Ten Million Miles Sunward* no doubt the sudden moving of a large enough body of water would influence the rotation of the earth, by gyroscopic action, but I fail to see how it could affect its position in relation to the sun.

The stories about Münchhausen are well told, and do not drag along. However, the Baron said that the ion neutralized the gravity of the water in the Martian Canals. Then since the water was without weight the rays easily forced it along the canal. But this would only reduce the *WEIGHT* and not the *MASS* of the water. Since mass is the amount of resistance a body offers to being moved, the only help the ion produced would be to reduce friction, which is negligible anyway. Also why wouldn't centrifugal force make it fly away?

The *QUARTERLY* fills the need for a more frequent publication nicely. The illustrations are good, but a few more wouldn't hurt. May your magazine be as good in the future as it has been in the past.

CHARLES WHEE,
Dallas, Tex.

[We cannot agree with you in your statement about the "tedious style" of Jules Verne and H. G. Wells. Both of them are very successful in introducing atmosphere into their stories. Atmosphere is what marks the perfect narration. Your criticism of Baron Münchhausen's theory of the water in the Martian canals is a little bit severe. Suppose we say that the Baron meant that the mass of the water was annihilated. If the water was without weight, would it not follow that it was without mass? If gravity had no effect, would not its inertia also be dispelled? We thank you for your good wishes and are trying to make the magazine better.—EDITOR.]

(Continued on page 182)

The Diabolical Drug

By Clare Winger Harris

(Continued from page 161)

gasp of amazement. In the entryway, with the street-light shining grotesquely upon his bent figure, stood an aged stranger.

"Are you the consulting physician to investigate Miss Gordan's case?" asked Mr. Gordan.

The elderly individual bent an interested glance upon the man before him. Then he replied.

"I—that is—yes, I believe I have an excellent cure for her condition. May I see her?"

"Certainly, this way, doctor."

The strange physician followed Mr. and Mrs. Paul Gordan to the room of their daughter. Upon the bed lay the inert form of the unfortunate young woman whose nerve impulses had been so retarded as to render her a misfit among all the rest of humanity about her. The aged doctor gazed at the still form intently.

"Not a day over thirty-two," he thought to himself.

Aloud he said, "Her most rapid cure will be accomplished by injecting this serum which—"

"But please, doctor!" pleaded the mother with a detaining hand upon his arm, "I—I don't like injected serums. Can't she—er—take it internally?"

"Unfortunately not, my good woman, but let me assure you, it will effect a rapid cure."

The mother surrendered and the old doctor injected into the arm of his patient a drop of colorless liquid. The effect was almost instantaneous. Ellen sat up quickly and looked from one to another of the occupants of the room.

"Mother, father!" she cried. "Has the world really stopped tearing around at such a fearful rate? Ah, I know it is I who am back to normal. I wonder if Edgar is succeeding in catching up with me. My measles won't last long now!"

The old man turned to leave the room, but stopped

at a question from the astonished father, Paul Gordan.

"To whom are we indebted for this restoration of our daughter to normalcy?"

The piercing eyes of the stranger swept the faces of all three.

"To Edgar Hamilton," he replied quietly.

"Oh, he sent you, did he?" laughed Mr. Gordan.

"Probably the young rascal was afraid to deliver the antidote in person after my somewhat plain letter this morning."

The aged man advanced a step with outstretched trembling hands.

"You do not understand, Mr. Gordan. I am Edgar Hamilton."

"You—well this is rich!" Aside to his wife, "We must humor the poor devil."

"Joking set aside," persisted the stranger, "I am Edgar Hamilton, to whom you owe your late catastrophe and its more recent remedy."

Then he proceeded to tell a tale of a spent lifetime, a tale so fantastic that it fell upon incredulous ears. It ended with a wild unearthly cry of, "Yangar, my son, Yangar." His shrieks grew louder until they became the ravings of a mad man.

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It is said that some months after Ellen Gordan's complete recovery from measles, she married a young man by the name of Manly Hamilton, who claimed kinship with the Edgar Hamilton, who had so mysteriously disappeared. There remain those of their acquaintance, who maintain that Ellen's husband and Edgar are one and the same man, but that does not explain the aged inmate of the asylum.

THE END

READER'S VOTE OF PREFERENCE

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Why:

- 1.....
- 2.....
- 3.....

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Why:

- 1.....
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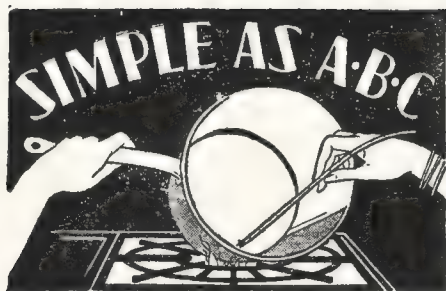


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MATTER; ITS RELATION TO ENERGY; THE UNIT OF MEASUREMENT OF ENERGY

Editor, AMAZING STORIES:

If only to break the uninterrupted stream of letters of praise, I feel that I must call attention to some errors that have crept into your work. The editorial in question is that printed in the March issue, in which you may recall making the following statement:

"The entire mass is 'actually disappearing progressively.'" (Speaking of the sun.)

You then go on to explain that the energy is liberated through the transmutation of the element hydrogen into helium and helium into the other elements of the atomic table.

Now, these two statements represent two entirely different theories as to the origin of the sun's energy and should not be confused with each other. If the first is accepted as true, then for each pound of matter destroyed, one pound of energy is liberated. If the second theory is true, then the result of the transmutation of one pound of hydrogen to helium would be the liberation of .008 pounds of energy, the remaining .992 pounds being retained as matter. Or, if it be inferred that you are trying to sum up the results of the second by the statement of the first, it is easily understood that there is a mistake. Destruction of the "entire mass" is obviously different from the partial destruction of matter by transmutation of the elements.

In another part of the same editorial you state: "—if the ashes, the smoke and the gases produced were all collected, they would weigh more than did the original coal."

As far as it goes, the statement is correct, but in its present form it is likely to create a wrong impression that matter is actually created in the process of burning. The total weights of the various resultants—ash, smoke, etc.—would weigh no more and no less than the total weight of the coal plus the oxygen. The law involved is the Law of Conservation of Mass.

Again, in commenting upon a letter of discussion, you state:

"—Helen Keller, who, though dumb, deaf, and blind—"

As I understand it, Helen Keller is not dumb. On the contrary, she is a very excellent speaker but unfortunately cannot hear or see her audience.

Your artist, in picturing the emergence of an object from the 4th dimension, makes the mistake of having the subject appear only half visible—and semi-transparent at that. An object rotated from the 3rd dimension into the 4th or the other way around disappears immediately or re-appears immediately after it has begun its motion. There is no half way; it is either visible or invisible. The story I refer to is the one about the Fourth Dimensional operation that appeared some time ago.

In the story "Into the Green Prism," the author has the atoms made visible by this new type of lens, enabling Ramon and his friends to watch their individual motions! Now as electrons are supposed to travel around their nucleus several million times a second and the atoms and molecules execute almost as great a rate of speed, a mechanism for slowing up the action would be required for a human eye to distinguish the individual atoms. But the wonderful scientist applies heat and watches them double their speed! Enough said.

JAMES MCCARTHY,
2847 N. Hope St., Philadelphia, Pa.

(Your terminology is so confused, or even inaccurate, that it deprives your letter of much of its force. There is no such thing as a pound of energy. Energy varies with the mass and with the square of the velocity, positive or implied, or energy may also be expressed by the product of weight by height in a gravitational field such as that surrounding the earth. The coal is burned and combines with the quantity of oxygen which forms water with the combined hydrogen of the coal, carbon dioxide with its carbon and if the coal contains iron pyrites, the iron and sulphur each take up a quantity of oxygen.

If you had heard Helen Keller speak, as the writer has, at a public exhibition, you would have found that she is virtually dumb; the speaking appears to be a purely mechanical affair and very indistinct. While it is an amazing display of patience and intellect on the part of Miss Keller, and of her very interesting associate, we would certainly pronounce her dumb.

As regards the change of an object of one dimension to another, our artist, unfortunately, never saw an object move from the third to the fourth dimension. We suppose you did not see it either. We thought, and believe most of our readers thought, that Mr. Verrill's story about the Green Prism was quite good.—EDITOR.)

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THE PROBLEM OF A NAME FOR OUR MAGAZINE; THE SHADOW AND TWO DIMENSIONS; INERTIA

Editor, AMAZING STORIES:

The other day I entered a jewelry store to make some trivial purchase. In a tray of finger rings on the show case was one that was set with a perfect diamond solitaire, whose scintillating beauty put it apart from all the others, making such a display of gorgeous, sparkling colors that I must needs investigate. Now, I knew nothing about diamonds nor of what they were composed, therefore I was extremely surprised and disappointed to find attached to the ring a tag on which was written "Carbon Rock." A rock! A mere carbon deposit! The name immediately destroyed my interest, so I did not stop to notice the truly marvelous, subdued lights glowing in the depths of the stone. A few moments later, as I was about to pass a newsstand, a particularly colorful magazine cover caught my eye. I knew less about this magazine than I did about diamonds, and was again sharply disappointed to see blazoned in shrieking letters across the top, **AMAZING STORIES**. The name fairly reeked of trash, sensationalism; and dropping the magazine, I continued on my way without stopping to notice that the remarkably well executed illustration with its wealth of scientific detail had no place on such a class of magazine as the name implied. In each case a flashing brilliancy had caught my eye and aroused curiosity, but the names had placed each article on such a cheap basis that it killed all interest, before I could investigate further. How different it would have been if some more conservative title had appeared! Some name to change idle curiosity to lively interest. A stranger to the name would perhaps wonder just what it meant, but almost before the thought could form, he would buy it. Even more interesting! Next his attention would turn more closely to the illustration, Paul's remarkable work would do the rest, and you have another fan.

Why must we call a diamond a rock? Just because you started with this handicap, must you keep it throughout the many coming years that your marvelous magazine must surely be with us? It is a certainty that changing the name will not cause any loss of steady readers, and it is an equal certainty that it would attract new ones. Even the few who wish to leave the magazine as is, seem to express only passive feeling, while you well know how vehement those are who favor the change. In the past few months two newsdealers advised that it would be to your advantage to change the name, and if they don't know, who does? You cannot change the name while the magazine is any younger, so let's change now.

In "Discussions" in the November issue, the editor promised to let the readers know the sales results of the September issue, which was adorned with the comparatively conservative scientific emblem. This was to take about three months from August 6, but I have received all copies since then, up to and including March, with no mention of the results. Did sales actually decrease to any appreciable extent?

I would suggest that you investigate the reprint possibilities of "The Moon Maid" by E. R. Burroughs, which appeared several years ago in "Argosy, All-Story Magazine." To the best of my knowledge it has never appeared in book form. It is an unusual story, and, of course, is written in that incomparable Burroughs style. 'Nuf said.

One of your correspondents complains because your stories recognize no impossibilities. Whatever you do, don't listen to him. If he desires ordinary stories, there are hundreds of magazines to supply them, while there is but one like yours, and yours is the one. Besides, who can be so far above a mere human as to separate the possible from the impossible?

Incidentally, at various times in "Discussions," you have expressed the opinion that interplanetary travel is not to be seriously considered, that it borders on the so-called "impossible," or words to that effect. Please don't express such ideas, even though I know that learned men consider interplanetary travel very, very remote from the present. But equally learned men assured the Wright brothers that they would never fly until they had confined a horsepower in the space of a watch case.

A shadow has been mentioned in "Discussions" as being a two-dimensional object, but I cannot see how this is correct. Suppose we have a box (or any other object) where it will cast a shadow. True, the visible shadow on the ground has only two dimensions, length and width; but if another object be interposed between the box and its shadow, it will be observed that this object is within the shadow cast by the box. Therefore, the shadow has a third dimension, depth; the depth being from any point on the visible shadow to the corresponding

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point on the object casting the shadow. If this is incorrect, will you explain how and where?

There is another thing that has me muddled up. Can an object have inertia without having weight? If a one pound object be moving at the same speed as a ten pound object, then the ten pound object will strike anything in its path with ten times the force of the one pound object. This would make it appear that inertia is synonymous with weight. But if that is true, a meteorite striking a space ship in space would simply stop, doing no damage, because there would be no force of inertia to overcome.

I hope to see AMAZING STORIES bigger, better and oftener in the future; with more tales of the future, of interplanetary travel, of other worlds and their inhabitants. The oftener it is published, the better, as long as the high standard of the stories is maintained. Both the Monthly and the Quarterly do not furnish a tenth of the scientific stories that it would take to satisfy me.

ORAL ARNEL,
Cedarville, Calif.

(We wonder if our correspondent in a very picturesque description of the diamond implies that we are one. He was affected by the fact that anything so beautiful as a diamond was a mere carbon deposit. Now suppose that he takes it the other way, and disliking the name of our magazine, finds that it is full of real diamonds. We can refer you to another letter where the idea of changing the name of AMAZING STORIES is heartily rejected. As regards the effect of the plain cover on the circulation of the magazine, we refer you to the April issue, page 80, at the beginning of the "Discussions" column. There the effect is told. Impossibilities will always appear in such stories as we publish, and as we maintain, many such impossibilities may become realities in time. Even if we do believe this, some of them are impossibilities forever. It was the late Simon Newcomb, at that time the leading astronomer of the United States, who said that it was absolutely impossible for man to fly. He didn't live long enough to know Lindbergh, not to say the Wright Brothers. As regards the shadow being two dimensional, the reference is to the shadow you see on the flat surface, not to the space between it and the original object. Inertia does vary with mass and the term weight which you use, means mass acted on by gravity, but inertia is not synonymous with either weight or mass but varies with the velocity squared.—EDITOR.)

A LETTER ABOUT THE "SKYLARK OF SPACE"

Editor, AMAZING STORIES:

I second the motion of Mr. Bradford that you ask Messrs. Smith and Garby to give you a continuation of the "Skylark of Space" with more data on "Osnome."

"Osnome" interests me particularly since the conception of an inhabited planet without sodium chloride leads to speculation. On earth, vegetable life does not need salt. Any analysis of the ash of a land plant showing either chlorine or sodium raises in my mind a *prima facie* query as to its accuracy. But with animals (the vertebrates, anyhow) the blood is basically a solution of common salt, which is why Mrs. Deer in Montana or Mr. Darkey in Central America will dare anything for salt. That the Osnomians might use copper in their biological and metabolic processes is conceivable enough. Terrestrial animals sometimes do. But it is as a substitute for iron; not for sodium chloride.

All in all, Mr. Smith's chemistry interests me, albeit I might say that the quantitative recovery of NaCl used as a flux at a white heat or thereabouts isn't quite clear to a laboratory man. NaCl is too volatile; isn't much of a flux and is too subject to metathetic reactions.

Personally, I should like to hear more of the "Skylark," of "Osnome" and of Mr. Smith's ideas. The "Skylark" is a real story. It set me guessing.

K. M. McELROY,
724 Ninth St., N. W.,
Washington, D. C.

(Remember that our correspondents, for the most part, write us very favorable letters and as you have often noticed, we publish many which are scathing, but AMAZING STORIES goes on. It is rarely that we get so interesting a letter as the one above from one who is himself a chemist. Salt is a curious factor in animal life as it has very specific effects on the body. It influences blood pressure, and yet it goes through the system, unchanged and unabsorbed. One is tempted to believe that its action might be influenced by hydrolysis, but this is a very far-fetched conjecture.—EDITOR.)

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COLDNESS IN EMPTY INTERSTELLAR SPACE

Editor, AMAZING STORIES:

Your magazine has furnished me with a few hours of enjoyment and has proved itself to be instructive and entertaining.

Naturally, your writers have to draw heavily on their imagination, and many of their statements are open to question. Here is one point I would appreciate having your opinion on.

We read a lot about the "coldness" of interstellar space, the cover picture of one of your recent issues, for instance, showed us space navigators securely clad in heavy furs. Is there any logic in that? If I feel cold here in my own room, it is because the chair I may sit on, the desk, the air around me, are cold. Just what would be cold in space beyond the earthly atmosphere? This space is assumed to be empty, so there would be nothing to be cold. Explanations are in order.

We feel cold because of excessive loss of bodily warmth. The loss may occur in any or all of three ways: radiation, convection and conduction. Heat is radiated through space by what is assumed to be motion or vibration of the ether, which is assumed to pervade all space. The amount of heat lost in this manner depends on the nature of the radiating substance—its thermal capacity, its thermal condition, its color. It does not depend, I believe, on the nature of its (gaseous) surrounding. The loss by radiation away from earth should, therefore, not be more than on its surface.

Loss by conduction and convection depend on a surrounding body, which we assume to be absent in interstellar space. Consequently, as our body depends on a certain amount of heat-loss to maintain an equilibrium, it would seem that if we should travel away from earth, we would have to think of means to guard ourselves from too much heat, rather than too much cold.

HAN A. KUNITZ,
Stratford, Conn.

(Your view of coldness in empty interstellar space is very interesting. Heat is radiated in a vacuum and is lost by the radiating body. Radiant heat is wave motion of the ether theoretically, and the vacuum of interstellar space is supposed to be full of ether. Of course, a body in interstellar space in sunlight would receive heat and perhaps would not fall in temperature. Your treatment of interstellar space suggests a thermos bottle or a Dewar flask.—EDITOR.)

A BRICKBAT FOR "CAUPHUL"

Editor, AMAZING STORIES:

The magazines of your firm have always found a welcome place on my reading table—AMAZING STORIES in particular. In SCIENCE AND INVENTION, RADIO NEWS and several other of your publications, I have read from time to time some highly fanciful "Scientifiction." Being broad-minded in regard to the future of science, I have said Aye to more than one hair-brained "futuristic" story, but now I'll balk for the first time in years.

In the January issue of AMAZING STORIES you printed (you ought to apologize) a literary effort by a Mr. Watson, entitled "Cauphul, the City Under the Sea."

This story ran along smoothly up to a certain point and then the whole issue went sailing into the waste-basket.

Tell me—where does Mr. Watson obtain such puerile, crack-brained ideas such as transferring muscular pains of human beings by electricity into grey squirrels? I found some such stuff in his story and it seemed to be sort of "thin." Why not cut the wires and allow the pains to "spark" off into space in place of wasting a perfectly good squirrel.

I am sure that your competent staff of scientists, which you maintain for the purpose of approving these stories, must have missed this particular odium, so I'll turn this brick into a rose and hope for the continued success of AMAZING STORIES.

ROBERT M. GERFIN,
State College, Penna.

A WREATH FOR "CAUPHUL" FROM A HIGH SCHOOL TEACHER

Editor, AMAZING STORIES:

I am going to the High School here in Los Angeles, and some time ago our English teacher asked us what magazines we were reading in our spare time. I told her that I was reading AMAZING STORIES.

I took down in school with me the January issue of the same for my teacher to see. She was very favorable to the magazine and approved it for us boys and girls to read, referring to the stories that she especially liked, namely, "Cauphul, the City Under the Sea" and "Absolute Zero."

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She said that she had read some Atlantis stories and that the information given in the story "Caulphul, the City Under the Sea" was correct.

She also said that she hoped that this gentleman, Mr. Watson, would write some more stories for you and that she would be sure to read them.

ERIKA FRIED,
2143 Duane St.,
Los Angeles, Calif.

(It is not often that we get so severe a letter as the first letter, but the curious point about it is that the second letter contains a criticism from a high school teacher, taking on quite a different tone.

The second letter is from a high school student who submitted the magazine to her teacher, who said that she especially liked "Caulphul," the very story which our previous correspondent has so vigorously abused. Mr. Watson will be very glad to hear the appreciation of his work. Although our first correspondent started with a very vigorously propelled brickbat, he did, like a professional gamin, turn it into a rose before it hit us.—EDITOR.)

A LETTER FROM A BLIND READER

Editor, AMAZING STORIES:

I cannot truthfully say that I am a reader of AMAZING STORIES because I cannot read at all, that is, ordinary printing, as I am blind, but my mother always reads the stories to me. Not only the stories, but all your editorials and your correspondence column, and I must say that of all the stories that have been read to me since I lost my sight "over there" years ago, I have enjoyed none so much as those from your magazine. I always look forward to next month's edition and am impatient for Dad to finish with it first, so that mother can read it to me. We have only been regular readers for about six or seven months, but I wish that it had been from the first month that your magazine was published. Judging from the criticisms of your correspondents, I have missed some really good yarns, and I only wish that there was some way of getting every magazine I have missed. I take such an interest in them because I was of a bit of a scientific turn of mind myself before my eyes went bad, but alas all that is no good to me now, as the doctors say, and I have had plenty of them, Harly Street specialists included, that there is no hope of my sight returning. But I am going to try and write a yarn on the lines of a little idea which I had in my head before going into the hospital, and which I have all worked out in my mind. The idea works all right, theoretically, but I cannot judge how it would work practically. However, if I can put it into story form, perhaps some reader could get to work on it, and perfect it. The yarns I like best are those on interplanetary travel, and I think that the "Skylark of Space" is one of the best stories I have ever heard or read. There is one part in that story which I think far-fetched and that is the "Mastery of Mind over Matter." Of course, that is only my opinion. Others say, and most probably too, think otherwise. I do not care too much for Wells, not the science part of his stories, but his style, but that is another point where others differ from me. Still it is absolutely impossible to please everyone and I don't discredit your magazine because one or two stories do not suit me. It is the best ever, and long may it reign. Could you give me particulars regarding the "Science Club," and whether I would be eligible to join? Although I am blind, I might still be able to give some theoretical advice.

Could you please tell me how much it would cost in English coinage to have the magazine and the Quarterlies sent to me regularly?

Well, I will have to close now. I hope you can read this scrawl, because I can't. I am writing it in a specially prepared frame made for the use of the blind. The cause of my loss of sight is the after effects of a few years' rough and tumble in Flanders during the scrimmage of 1916-1918.

JACK HART,
3 International Arcade,
West Street, Durban, Natal.

(There are few more admirable traits than cheerfulness in adversity and certainly blindness is an adversity. Cheerfulness under such circumstances produces the most admirable example of efficiency in that our South African writes a most interesting letter. All the editors can say is that they give great care to the selection of the stories and the letters we receive from our correspondents, of which only a few are published in the discussion columns, show that we have a good degree of success in pleasing our readers and that is what we are here for. The letter we have received is written by a correspondent who is blind from the effects of war and no one would ever dream that the writer did not have his sight. The information you ask for will be forwarded by our Subscription Department.)

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A LADY READER PRAISES OUR COVERS

Editor, AMAZING STORIES:

I have never before tried to break into your "Discussions" circle, having nothing to say except in unqualified praise of your magazine, and I thought you had all of that you needed. But, really, I must disagree with Mrs. L. Silberberg and Ray Palmer about the cover of my favorite magazine. I am never ashamed to be seen either buying or reading it—in fact, I display it on every occasion possible. I, for one, have never enjoyed being one of the crowd, but prefer to do my own thinking, and when I see another person reading AMAZING STORIES I know that there is one who, like myself, has dared to break away from the so-called "popular" type of fiction and read stories that are full of excitement, daring adventure and in many instances, prophecy.

Instead of feeling sheepish, as does Mrs. Silberberg, I feel that it stamps one with individuality to be seen carrying AMAZING STORIES. An unintelligent person might not be interested in the type of stories printed in it. And persons who judge a magazine solely by the cover, without a glance at the contents, shouldn't be considered anyway.

I, too, from my earliest years have been interested in stories that were "different." I know very little science, but have a great interest in it. I am especially fond of stories of interplanetary travel, and consider "The Skylark of Space," which I have just finished, a masterpiece of its kind, and exceedingly well written.

Merritt's "Moon Pool" was great. I whooped with joy, right on the street, when I saw that you were reprinting it in your magazine, and I am sure "The Ship of Ishtar" would prove as popular.

I have been a reader of AMAZING STORIES since almost the first issue, and I WAS ATTRACTED TO IT BY THE COVER! Have never missed one since the first one I read, and have enjoyed the QUARTERLIES and ANNUALS very much. Hope I never have to miss one. In fact, if reduced to choosing between meals and AMAZING STORIES I would forego the meals—and I may add, I enjoy eating.

Let the Mrs. Silberbergs and Ray Palmers tear the covers off their copies if they wish, but please don't tone Mr. Paul down one bit.

(Mrs.) H. SNYDER,
Lake Wales, Fla.

(We wonder what those of our readers who object to our covers will say to this letter. We certainly admire much in the "Moon Pool," some of the character drawings and references to the old Celtic legends were very impressive. Mr. Merritt showed in it a limitless extent of imagination that did not obliterate the character drawing, which really approximated a really scientific presentation. —EDITOR.)

OUR COVER ONCE MORE; THIS TIME IT IS DEFENDED

Editor, AMAZING STORIES:

The AMAZING STORIES cover seems to be a constant topic in the "Discussion" column. The letters point to it as probably the biggest fault of the magazine.

In the December issue, a letter from Melvin Brady is printed. He tells of an incident where a man was looking over a magazine-rack, in a drug store where he works, and "was attracted by the 'scaring' yellow background of your magazine." He further states that he approached the man, in search of a sale, and attempted to describe the magazine, its stories, discussion, etc. Mr. Brady was called to the soda fountain and shortly after he saw the man look at the cover, replace the book and walk out.

Therefore he places the blame on the "scaring yellow background of your magazine."

As you are probably realizing, if you have read this far, I do not agree with Mr. Brady. I have been a constant reader of both AMAZING STORIES and AMAZING STORIES QUARTERLY ever since the June issue when I was attracted to the cover by the picture illustrating the "Blue Dimension."

The issue that Mr. Brady cites as an illustration, is I believe, that of August 1928. The cover shows a man flying through space. For curiosity's sake, anyone would pick up that magazine, and that is just what "his man" did. But after Mr. Brady explained and described the magazine, the man realized that it was of the type he was not interested in.

The same is shown when I say that I will not purchase a magazine when the cover shows a picture of a cowboy or a western scene, because I do not like western stories.

Possibly Mr. Brady noticed in the December issue on page 855, opposite his letter, a picture of

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a new magazine "Aero Mechanics." That in colors would be what I'd call loud, but I'll wager, though we have no piano to eat a corner off, that that magazine sold plenty among airplane lovers.

That in my opinion does the same as the cover of AMAZING STORIES.

ALFRED BEACH,
3586 E. 129th St., Cleveland, Ohio.

(This letter speaks so well for itself that not only is no comment needed, but it is hard to say anything to make it clearer. We might count it one of our troubles that we receive such contrary opinions about our cover page illustration. We know that they do illustrate the stories excellently, that the scientific features of the illustrations are extremely good, such as apparatus, etc., so we naturally feel that they are doing good work.—EDITOR.)

VIEW OF A YOUNG READER AND CRITIC

With the exception of a copy or two, I have read AMAZING STORIES since its birth. As for SCIENCE AND INVENTION, I have read it for five years. I have learned a great deal from your educational magazines and I would like to make a few remarks.

I am one of your younger readers, about fifteen, and I am a freshman in high school.

Now to air my opinions on different subjects. Why? Oh why, did you have to tack the glaring title AMAZING STORIES on such a magazine? To anyone not familiar with your stories, the suggestion is that of several pages packed full of lurid thrillers of the cheaper kind. It seems to me that "Scientification" or some similar title would have been much more appropriate.

As for "Fourth Dimensional Surgery," I fail to see how the forceps could pass through third dimensional matter and extract another type of third dimensional matter. The gall stones would have to be in the fourth dimension also to be withdrawn. Furthermore, how could the stones be removed while the whole body was in the fourth dimension? If he could put his hand into his body, how could he grasp the stones? I hope I have made myself clear and would appreciate correction if I am wrong.

What's the matter with Mr. Fosdick and Mr. Hicks and your other funny and humorous stories? It may be crude comedy and all that but I like it if it's not overdone. You have heard that, "A little nonsense now and then is relished by the best of men." Isn't real life serious enough without piling on a lot of fictional sadness and gloom?

To put in my oar about H. G. Wells, I think his short stories are good, but his longer ones become tiresome in places on account of too much detail and social problems.

"Baron Münchhausen's Scientific Adventures" suit me all right.

Please tell Mr. Merritt to tame his stories down a bit. I always need a hair-cut after reading one of his flights of imagination—I am still reading them though.

In the story "The Yeast Men," it seems to me that the dough would be more in the shape of a ball than in the shape of men, but it made the story more interesting to have men I suppose.

The characters in "Robur the Conqueror" seem to me to be half-baked, especially Uncle Prudent and Frycollin. By the way, isn't most of Jules Verne's "extravagant fiction" cold fact by now? Why not leave out Verne's "cold fact" stories?

I realize of course that you are not publishing your magazine for my especial benefit so I won't expect your next copy to have all my suggested alterations. Nevertheless I have my opinions and ideas (if you would call them that) off my chest. You have asked for them so you get them.

P.S. I think your artist, Paul, is all right. Do those who pan him for having one eyebrow longer than the other, never make a mistake, or what?

DALE JOHNSON,
Aberlin, Kans.

(If you would look over the records, you would find that AMAZING STORIES was about the best title submitted, and as an additional experiment, see how difficult it is to evolve a thoroughly good name.

You must not take stories about the fourth dimension too literally. We never knew before that Mr. Merritt was a developer of business for barbers, but we will admit cheerfully that his imagination takes wonderful flights—and we are not ashamed to say, quite beyond the scope of the imaginations of most of us. We are very glad to get your suggestions, however, and are glad that you like Mr. Paul's work. He is pretty well identified with our magazine and is certainly a favorite with very many of our readers.—EDITOR.)

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Partial Contents

May Issue Just Out

The Origin of Man, by Dr. Ales Hrdlicka, U. S. National Museum, Washington, D. C. This comprehensive and authoritative article on the evolution of man has been written exclusively for SCIENCE AND INVENTION Magazine, by one of the world's greatest experts on the study of man, Dr. Hrdlicka. The article is specially illustrated with pictures which show the evolutionary rise of man from the earliest protoplasmic stage up to the present day.

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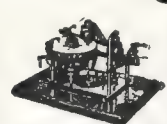
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A YOUNG STUDENT READER AMAZINGLY DESCRIBED

Editor, AMAZING STORIES:

Just a note to tell you how anxiously your magazine is awaited.

My son is fourteen and of a mechanical and inventive mind. He haunts the drug store for several days when it is time for your magazine AMAZING STORIES to arrive. He reads it from cover to cover and understands it perfectly.

The first one I saw I thought was rather a freak magazine, but several times I have heard him talk with men on subjects that were out of my reach. I had scarcely ever heard of them and I now feel that it is a most wonderful educational and interesting magazine.

He just reads by the hour and never leaves a word unread, and besides keeping him out of mischief, I feel that he is acquiring an education at the same time.

He likes the few illustrations, but says it is the only magazine that has so much reading and that is the best part of it and he hopes you won't change it.

He helps with dishes or begs for any housework in order to get money to buy it.

Right now he has finished your August magazine and has just talked me out of fifty cents for the new QUARTERLY. So I am sure you have a very loyal booster in Billie.

Will you please send him the story?

Mrs. W. R. STEELE,
(Please send address)

[We are very much interested in what you tell us about your son. So many of the younger generation have taken to our magazine and have written to us words of true encouragement, that we are glad to add your son's criticism, if we may merit it so, to the rest. He will appreciate it all the more because of the work he has to do to get the money to pay for it. We congratulate you on your idea of educating the young. We are glad to have Billie for a loyal booster.—EDITOR.]

A NICE LETTER FROM A GIRL READER AND FRIEND

Editor, AMAZING STORIES:

You always seem glad to get letters of comment on AMAZING STORIES from girls, so here goes. I'm just another girl who is interested in scientific. I have no claim to being a scientist, or a literary critic, but I certainly like AMAZING STORIES.

From the time I was a little girl about five years old (I'm nineteen now) when my father told me that the stars were not little five-pointed things about the size of my hand, but big, round worlds, most of them bigger than our world, I have been immensely interested in the stars.

The first time I ever read AMAZING STORIES was when I read "Station X." It was exactly what something inside me had been craving for a long time, and I never read a story that simply held me tense as that one did. I shall never forget it. Lots of other stories since then have been very good, but that was the first and the best amazing story I ever read.

One letter in the "Discussions" column said to leave out the "love stories." The man who wrote that must be a bachelor, or else one of those "cold, machine-like scientists" we read about, and I can't agree with him. Of course, no one wants a lot of "soft soap" in stories of this kind, but a little romance mixed in, properly proportioned, makes the story more human. Not all great scientists are bachelors, you know, and therefore must have had a little romance in their lives, so why not make the stories more real?

As to the cover designs, I like them myself, but as another reader says, they are so brilliant they make me feel like a walking bookworm, a fanatical one at that, whenever I carry it on the car or on the street. I'm not ashamed of the fact that I read AMAZING STORIES, however. As I told a friend of mine who made fun of me for reading "such trash," they make your brain work, and anyone who doesn't like them either hasn't the brains or enough ambition to understand them. Not that all the stories are the special kind I like, but everyone is entitled to an opinion, and I don't mind having to skip one I don't like once in a while.

With best wishes for lots more amazing stories (You can put the accent on either the word "more" or the word "amazing"),

ALICE K. CROUT,
627 Juliana St.,
Parkersburg, W. Va.

(We certainly are always glad to get letters of comment on our stories from girls, so we have ventured to call you not only a girl reader, but a girl friend. Your views on the question of love as a motive in stories we thoroughly agree with.

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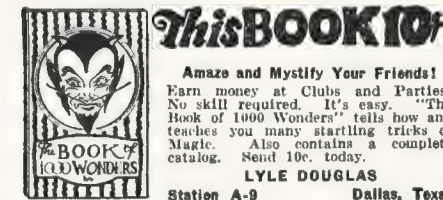
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We would be very sorry to see it ostracized; and think how many of the literary monuments of the world are built up on love. Almost every great novel is a love story. Dante, who often appears a sombre writer, but whose epic the *Divina Comedia*, carries the thread of love all through it, and whose *Vita Nuova* is all about his love for Beatrice, vindicates love as a theme in fiction. "Station X," to which you allude, has won many favorable criticisms from our readers—perhaps, on the average, more than most stories. We certainly feel that it holds the reader's attention to the end. —EDITOR.)

A CORRESPONDENT WHO WANTS REPRINTS

Editor, AMAZING STORIES:

I've long intended to add one more voice to the chorus of cheers for AMAZING STORIES. In the meantime, I have done my bit toward enabling you to make AMAZING STORIES "bigger and better"—I can conservatively credit myself with twenty-five converts to the ranks of your admirers. Just give the ordinary man one old issue, and he becomes a steady customer. If some of those who want more for their quarter would help swell the ranks this way, it would be more to the point, instead of their complaints about the choice of stories.

Of all the stories you ever published, I prefer the "Moon Pool," by A Merritt. I read it eleven years ago in the "All-Story Weekly," but it was that much the better for the second reading. By the way, like Mr. Graham, of Australia, I would very much enjoy reading again the "Blind Spot"—I can assure him that if he only read the first instalment, he missed "plenty!" But most of all, I should like to see the series of stories from the same publication (All-Story Weekly) containing:—"Palos of the Dog Star Pack," "The Mouth-piece of Zitu," and "Jason, Son of Jason." These three are the best "interplanetary travel" stories ever published, even including Edgar Rice Burroughs, who is hard to beat.

In conclusion, let me state that I have enjoyed every issue (practically every story) since the first number of AMAZING STORIES, and expect to see a great number of the "impossibly weird ideas" become "everyday commonplaces." (I am only twenty-three.)

W. J. WALSMITH,
New Albany, Ind.

(This letter speaks for itself and it is so commendatory of our humble efforts that we are almost ashamed to publish it. We are glad to see you among the admirers of stories which we are personally impressed by.)

With regards to your concluding paragraph, you have many years ahead of you and in time probably will see startling changes. For older people of this generation, it is amazing to look back to what has happened in the world of science since 1876 when the telephone was nothing but an interesting scientific novelty.—EDITOR.)

AN AMUSING LETTER ABOUT H. G. WELLS

Editor, AMAZING STORIES:

I have been reading AMAZING STORIES for a year and a half. On the average, I like your stories very well, but once in a while one comes along that is terrible. I have just finished reading your Winter QUARTERLY for 1928. I liked most of the stories very well, but I don't understand how H. G. Wells could have written such a story as "When the Sleeper Wakes." It seems to me that the tale is a curious mixture of conditions existing fifteen years ago, and—say—seventy-five years from now. We had better airplanes, of the small type he depicts, fifteen years ago than those he describes. We have far better air-liners now than those in the story. The little motors sound almost obsolete, except for the fuel, and there's no telling what that is! The city itself is more plausible, though I have read far better descriptions of the future city, as far as conforming with my own imagination is concerned.

Why didn't Wells end the story by the fellow waking up in Ishister's house the next morning and finding that he had dreamed all that nonsense? Or by coming out of the crash alive and marrying that girl?

Maybe I have it in for H. G. Wells, any way, because when a senior in High School I had to write a long paper on his life and works! I have never had any use for him since!

O. C. TALBERT.

Rice Institute, Houston, Tex.

(We publish this letter to show that we appreciate severe criticism. We have only this to say about the city which you say is more plausible; and that is, no two people would construct the city of the future alike, if both depended upon their imaginations.—EDITOR.)

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A NEW ENDING FOR A WELLS STORY

Editor, AMAZING STORIES:

I wish to submit a few comments on your story *When the Sleeper Wakes*, by H. G. Wells.

It was indeed a wonderful piece of fiction, good until the very end. But the ending was really a disappointment, as far as I'm concerned.

Why couldn't Mr. Wells continue his story something like this:

"He was beaten but London was safe. But was he beaten? Even as he thought that he would soon go to his final sleep, and there meet his old comrades, the Aeropile side-slipped, met the earth with a long grinding noise that drowned out the shouts of the vast number of the people of London—a soft pleading voice, such a voice as only an angel could possess, caught his ear. Surely this must be heaven, his heaven, the heaven where all were equal. The heaven which should have been his many years before. Graham also heard a terrific shouting about him, probably the cries of the lost souls, now in the hands of Satan.

Slowly Graham opened his eyes, expecting to face his master, the Lord, to be judged as the Lord saw fit—to be saved and meet his old comrades, or to be damned and again go through a hell such as he had just left.

But lo—there stood Helen, his Helen, wonderful creature, the crowd roared, but Helen heard not. Her arms were clasped around his neck, her lips, soft and full met his, and stayed there.

Certainly two hundred years had not stamped its mark on love, for Cupid still roamed and ruled the hearts of the people of the world.

His people could have his wealth, his title of master and even the whole world, but *Helen* was his forever."

THE END.

P. S. I might just as well say, "Came dawn," and get it all out of my system.

You folks may have a hearty laugh at my expense, but don't you think this would have been a more suitable ending? I do.

JOHN G. ROCHE,
11 Cornelius Ave., Schenectady, N. Y.

[This ending of Mr. Wells' story speaks for itself. We wonder what Mr. Wells will think when he reads it.—EDITOR.]

FRIENDLY CRITICISM FROM BRAZIL

Editor, AMAZING STORIES:

I have been reading AMAZING STORIES whenever I could obtain a copy ever since its debut. There has never been a story that I did not thoroughly enjoy, although some I did not like as well as others. I can find no fault with the authors and, to my mind, the people who start picking flaws in the stories are like those people we all know that seem to visit picture houses for no other purpose than to spoil the program for the other visitants, by frequently exclaiming, "Oh, that is faked, a double exposure. No, the airplane isn't really flying at all," etc., etc. I think we all have sufficient intelligence to realize these things, so why spoil the picture by bringing them up? I do not mean, of course, that errors in science should go uncriticized, but it seems to me that the majority of criticisms, so far, have been of little importance, and were probably written by persons without sufficient imagination to be able to visualize the stories.

"Pollock and the Porro Man" was a story I would have expected to find in something like "Weird Tales," but nevertheless I liked it all right. It brings to my mind an occurrence in Peru a few months ago. There live in the mountains a race of Indians who, as part of their religion, preserve the heads of their dead by means of a process of "curing" by heated pebbles. The heads become greatly reduced in size during the process and are, of course, sacred to the Indians. A certain white man led an expedition to hunt these heads, as they are very valuable. He disappeared, and a month later the rest of the party found his head in a shrunken state, evidently left as a warning.

I have not been able to get all the numbers of AMAZING STORIES. (It is on sale in Buenos Aires and Rio de Janeiro, by the way) and those I could get I would not keep, as others seemed to be equally interested in AMAZING STORIES.

By the way, I enjoyed "The Invisible Man" very much. There was a similar story printed in a well-known magazine some time ago called "The Invisible Professor." It is written from a modern view and if possible, I would like to read it again.

I like your discussions because there are some good scientific arguments there.

J. A. TODHUNTER,
Rio de Janeiro, Brazil.

[All editors and authors in general, will make up their minds to stand criticism and must not expect it to be always favorable or always just. You are not the only one of our readers whose friends borrow copies and fail to return them.—EDITOR.]

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